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BULLETIN

OF THE

MASSACHUSETTS DEPARTMENT

OF MENTAL DISEASES

(PUBLISHED QUARTERLY)

JANUARY, 1921

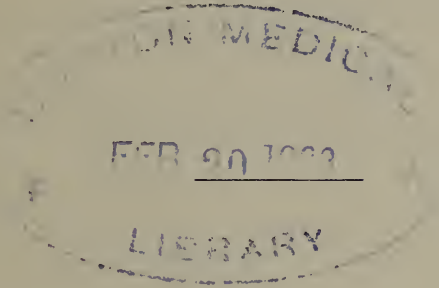
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MASSACHUSETTS DEPARTMENT
OF MENTAL DISEASES

(PUBLISHED QUARTERLY)



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JANUARY, 1921

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CONTENTS.

| | PAGE |
|--|---------|
| 324 (1921.1). A Survey of 100 Cases of Drug Addiction entering Camp Upton, New York, via Draft, 1918, | 5-11 |
| GEORGE E. MCPHERSON, M.D., Major, Medical Corps, and JOSEPH COHEN, Ph.D., Lieutenant, Medical Corps. Boston Medical and Surgical Journal, Vol. CLXXX, No. 23, pp. 636-641, June 5, 1919. | |
| 325 (1921.2). Further Observations on Neurosyphilis and the Psychoses, | 12-45 |
| LAWSON G. LOWREY, M.D. Archives of Neurology and Psychiatry, May, 1920, Vol. III, pp. 500-529. | |
| 326 (1921.3). The Technique of Lumbar Puncture, | 46-50 |
| LAWSON G. LOWREY, M.D. Boston Medical and Surgical Journal, Vol. CLXXXII, No. 19, pp. 479-481, May 6, 1920. | |
| 327 (1921.4). Statistical Classifications as applied to the Work of Temporary Care Institutions, | 51-56 |
| LAWSON G. LOWREY, M.D. Proceedings of the American Medico-Psychological Association, Seventy-fifth Annual Meeting, Philadelphia, Pa., June 18 to 20, 1919. | |
| 328 (1921.5). The Mental Hygiene of Industry: A Movement that particularly concerns Employment Managers, | 57-77 |
| E. E. SOUTHARD, M.D. Industrial Management, February, 1920. | |
| 329 (1921.6). Trade-Unionism and Temperament: The Psychiatric Point of View in Industry, | 78-93 |
| E. E. SOUTHARD, M.D. Industrial Management, April, 1920. | |
| 330 (1921.7). The Modern Specialist in Unrest: A Place for the Psychiatrist in Industry, | 94-106 |
| E. E. SOUTHARD, M.D. The Journal of Industrial Hygiene, May, 1920, Vol. II, No. 1, pp. 11-19. | |
| 331 (1921.8). A Case of Myxedematous Psychosis: Clinical and Pathological Report, | 107-125 |
| S. UYEMATSU, M.D. Archives of Neurology and Psychiatry, March, 1920, Vol. III, pp. 252-276. | |
| 332 (1921.9). Atypical Form of Arteriosclerotic Psychosis. A Report of a Case, | 126-142 |
| S. UYEMATSU, M.D. The Journal of Nervous and Mental Disease, Vol. 50, December, 1919. | |
| 333 (1921.10). A Case of Diffuse Cerebro-spinal Sclerosis, | 143-156 |
| S. UYEMATSU, M.D. The Journal of Nervous and Mental Disease, Vol. 51, No. 6, 1920. | |
| 334 (1921.11). Agreement in Results of the Wassermann Reaction: A Study of Tests performed by Two Laboratories in Three Thousand Successive Hospital Admissions, | 157-162 |
| HARRY C. SOLOMON, M.D. Journal of the American Medical Association, March 20, 1920, Vol. 74, pp. 788-790. | |

SELECTED MEDICAL AND SCIENTIFIC STUDIES.

A SURVEY OF 100 CASES OF DRUG ADDICTION ENTERING CAMP UPTON, NEW YORK, VIA DRAFT, 1918.*

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Early in June of this year it became noticeable that a relatively large number of drug addicts were being received at camp. These men passed before selected examining teams, and, as suspected cases, were sent before a special board for disposition. Statistics prepared at the time of writing this paper show that of all the rejections in five months, under the Neuro-Psychiatric Service at this camp, 17 per cent were drug addicts, which indicates the importance of this disease. During the five months from May to September, inclusive, 53,000 recruits were examined. In this period of time 178 drug addicts were rejected, approximating 35 per cent of the total number of drafted men.

Previous experience in accepting these recruits for service and attempting to treat them with hope of improvement at the base hospital had so uniformly and ingloriously failed that the policy of rejecting all positive cases was instituted in June. Most of such men gave a history of numerous trials at various "cures," whose failure was apparently complete.

Where the statement of the recruit was substantiated by positive physical symptoms of withdrawal, or in those cases exhibiting recent corroborative marks of hypodermic needles, such men were at once rejected from the draft and returned to civil life as unfit for military service; otherwise suspects were sent to duty or to the base hospital for further observation. It

* Reprinted from the Boston Medical and Surgical Journal, Vol. CLXXX, No. 23, pp. 636-641, June 5, 1919.

was found to be perfectly practicable to observe these men in their companies and to have distress relieved by the battalion surgeons, until the necessary discharge papers could be procured and these men dismissed from camp.

A considerable number of such addicts begged for a chance to stay in the service, apparently thinking the army life offered a cure where other attempts had failed. Several were allowed to try it, even against one's better judgment, and without other assistance than regular life and reasonable physical exercise. Most of such experiments failed, and emphasized the poor material from which such addicts are fashioned. Although not grading low psychologically, these men are below par in moral sense, judgment or perseverance in good habits.

About July 1 it was decided, with the co-operation of the Psychological Division, to attempt the examination of a set number of drug addicts; to grade them psychometrically; to obtain their histories,—all with the hope that the resulting information might prove instructive. Certain it is that in the large cities the Federal law does not successfully suppress the traffic in narcotics. The majority of those men who had drugs in their possession exhibited vials with drug-store labels, and had "permits" from physicians to facilitate the obtaining of drugs.

A large percentage of these men coming into camp had been caught without sufficient supply of drugs, so that they were, in the majority of instances, suffering more or less acutely from their withdrawal. Eighteen men were in good physical condition and showed no mental distress. The remainder (82 per cent) exhibited symptoms varying from feelings of weakness and drowsiness, on one hand, to conditions of exhaustion and collapse on the other. Marked tremors, especially facial, sweats, abdominal cramps, often severe, and nervousness emphasized the unhappy condition of those who had run short in their supply.

In an attempt graphically to present the histories of these addicts, 50 cases have been charted. This lot of 50 is entirely representative of the entire survey of 100 or even more, and is evenly divided between whites and negroes. While it is not the purpose of this paper to prove any set of conclusions, the following résumé deserves some attention.

Mental-age Ratings (Basic Year, Upper Limit).—Mental-age ratings secured by the Stanford-Binet, Point-Scale, Performance-Scale and Beta Tests indicate that the intellectual level of drug

Fifty Drug Addict Cases. Compilation of Mental Age Ratings and Personal Data, Camp Upton, New York.

| Case No. | Mental Age. | Basic Year. | Upper Limit. | Birthplace. | Yrs. in U. S. | Schooling (Grade Reached). | Drug. | Age Habit was Contracted. | Locality in which Habit was Contracted. | Duration of Habit (Yrs.). | Daily Consumption. | Frequency of Dose. | Manner of Contracting. | Cures and Relapses. | Manner of Taking Drug. | Disease History. | Alcohol (Addiction to Use of). | Condition at Time of Examination. | Criminal History. |
|----------|-------------|-------------|--------------|-------------|---------------|----------------------------|-------------|---------------------------|---|---------------------------|------------------------|--------------------|---|--|------------------------|-----------------------|--|---|---|
| 1 | 9.0 | 9 | - | N. J. Va. | - | 3 | H. M. | 20 | New York City. | 3 | - | - | Associates. | Tried cures. | Hypo. | S. and B. fits. | None. | Appeared normal. | None given. |
| 2 | 13.6 | 9 | 14 | N. J. | - | 5 | H. M. | 18 | S. Orange, N. J. | 10 | * 5 gr. † 4 gr. 12 gr. | 6 doses daily. | " | None. | " | Pos. ven. | " | Normal. | 1 yr. possessing drugs; 1 yr. reformatory, use of. |
| 3 | 9.0 | 9 | - | N. J. | - | 4 | H., C. & M. | 25 | Newark, N. J. | 3 | - | - | " | " | " | Neg. | Occasionally whiskey. | Drowsy, restless; said he was suffering. | None given. |
| 4 | 9.0 | 9 | - | S. C. | - | 3 | H. & M. | 26 | Mt. Vernon, N. Y. | 5 | 20 gr. | 5 doses daily. | " | " | " | F. dead of paralysis. | Very heavy before addiction, neg. now. | Normal. | 3 arrests and convictions, causes unknown. |
| 5 | 11.0 | 9 | 12 | N. C. | - | 5 | H., C. & M. | 19 | New York City. | 9 | 20 gr. | 4 " " | Taken by advice of "friend when sick." | Taking "cure" but still uses. | " | Pos. ven. | Prior to addiction, not now. | Slight ennui. | Served sentences for assault, peddling, burglary. |
| 6 | 8.7 | 8 | 9 | Ohio. | - | 8 | H., C. & M. | 21 | Syracuse, N. Y. | 3 | - | - | Associates. | None. | " | " " | None. | Marked tremors, partially under control. | None given. |
| 7 | 15.2 | 10 | 18 | N. Y. | - | 8 | M. | 19 | Troy, N. Y. | 11 | 15 gr. | 5 doses daily. | By advice when sick. | Attempted 3. | " | Neg. | " | Low spirited, can hardly stand; weak. | " " |
| 8 | 10.6 | 8 | 14 | N. Y. | - | 6 | H. | 18 | Brooklyn, N. Y. | 6 | 15 gr. | 7 " " | Associates. | King Co. Hosp. abst. 3 mos. Medicines. | Sniffing. | Pos. ven. | " | No nervousness; vacillating stare. | " " |
| 9 | 9.0 | 9 | - | Va. | - | 7 | H. & C. | 16 | Newark, N. J. | 7 | 15 gr. | 5 " " | " | " | Hypo. | Neg. | " | Feels weak; mind is clear and active. | " " |
| 10 | 12.3 | 12 | 16 | N. Y. | - | 8 | H. | 21 | Brooklyn, N. Y. | 5 | 11 gr. | 3 " " | " | Belladonna in jail. | " | " | Excess before addiction. | Abst. symptoms. | Arrests for drug addiction. |
| 11 | 14.4 | 10 | 16 | N. R. | - | 8 | H. | 16 | New York City. | 10 | 22 gr. | 4 " " | Curiosity. | 6 cures. | Hypo. and sniff. | " | Excess before drug addiction. | " " | Convicted for possession of drugs and larceny. |
| 12 | 10.8 | 10 | 12 | N. R. | - | 3 | H. | 22 | Brooklyn, N. Y. | 6 | 17 gr. | 25 " " | Associates. | Abst. 3 mos. in jail. | Hypo. | " | None. | " " | 1 sentence of 3 mos. viol. of liquor laws. |
| 13 | 11.3 | 9 | 16 | Ore. | - | 10 | O. | 18 | China. | 12 | \$4.00 | Smokes. | " | 5 cures. | Smoking. | " | " | " (mild). | Frequent arrests for use of opium. |
| 14 | 13.5 | 12 | 14 | N. Y. | - | 4 | H. | 17 | Brooklyn, N. Y. | 9 | 25 gr. | 6 doses daily. | " | 25 gr. | Hypo. | Tub. in family. | Moderate. | " (mild). | None given. |
| 15 | 15.8 | 14 | 16 | N. Y. | - | 7 | H. | 18 | New York City. | 5 | 20 gr. | 5 " " | " | 2 cures. | " | Neg. | " | " | " |
| 16 | 9.9 | 8 | 14 | Italy. | 20 | 0 | H. | 20 | New York City. | 9 | 15 gr. | 3 " " | " | 1 voluntary. 1 yr. in prison. | Sniffing. | Pos. ven. | Sometimes to excess "after" addic. | Abst. symptoms (recovering). | 1 yr. in prison. |
| 17 | 14.0 | 14 | 14 | N. Y. | - | 6 | H. & C. | 16 | Brooklyn, N. Y. | 7 | † 12 gr. ‡ 20 gr. | 4 " " | Worry over charge of manslaughter. | 1 in hosp. 3 arrests. | " | Neg. | Excess before drug addiction. | Abst. symptoms. | 1 arrest on charge of manslaughter. |
| 18 | 14.0 | 14 | 14 | N. Y. | - | 7 | H. | 19 | New York City. | 7 | 20 gr. | 4 " " | Associates. | 8 cures. 2 in prison. | Hypo. | " | Excess before drug addiction. | " (severe). | 2 jail sentences, causes not given. |
| 19 | 12.8 | 10 | 16 | N. Y. | - | 7 | H. | 19 | Brooklyn, N. Y. | 10 | 40 gr. | 10 " " | " | 6 cures. | " | Pos. ven. | Moderate. | Abst. symptoms (recovering) tremors at mouth. | 3 mos. in workhouse for use of drugs. |
| 20 | 13.7 | 10 | 16 | Russ. | 12 | 5 | M. | 19 | New York City. | 7 | 30 gr. | 6 " " | " | 3 hyascine. 1 belladonna. | " | M. insane; B. tub. | None. | Sweats, cramps, weakness and nervous. | 2 pen. grand larceny; 8 workhouse, minor offense. |
| 21 | 15.8 | 14 | 16 | N. Y. | - | H. S. | H. | 20 | Staten Island, N. Y. | 4 | 10 gr. | 4 " " | " | 3 in prison. | " | Neg. | Moderate. | Normal. | 6 times for assault. |
| 22 | 13.0 | 9 | 14 | N. Y. | - | 6 | H. | 24 | Brooklyn, N. Y. | 6 | 18 gr. | 15 " " | To relieve pain of cancer. Medical adv. | King Co. Hosp., 46 days. | Sniffing. | " | " | Abst. symptoms. | Arrested but not convicted for use of drugs and assault; 4 jail, drugs. |
| 23 | 13.4 | 12 | - | N. Y. | - | 0 | H. & M. | 17 | Brooklyn, N. Y. | 3 | 50 gr. | 8 " " | Associates. | Tried self cure. | Hypo. and sniff. | Pos. ven. | " | " | 1 pen., larceny. |
| 24 | 11.0 | 9 | 12 | Penn. | - | 1 | H. & C. | 22 | Wilmington, Del. | 6 | 20 gr. | 3 " " | " | 3 hosp. cures. 5 in jail. | Hypo. | F. tub. | " | Headache, blue, and sick stomach. | None given. |
| 25 | 11.0 | - | - | Del. | - | 0 | H. & C. | 19 | Wilmington, Del. | 9 | 50 gr. | 8 " " | " | None. | Hypo. and sniff. | Neg. | " | Weak and cramps in stomach. | " " |
| 26 | 9.0 | - | - | N. C. | - | 0 | H. & C. | 16 | Wilmington, Del. | 10 | 45 gr. | 18 " " | " | " | Sniffing. | Pos. ven. | Lots of gin. | Sick and weak all over. | " " |
| 27 | 12.5 | - | - | N. C. | - | 2 | H. | 22 | Wilmington, Del. | 6 | 60 gr. | 4 " " | " | " | Hypo. | " | Moderate. | Weak and cramps in stomach. | " " |
| 28 | 11.0 | - | - | Del. | - | 5 | C. & H. | 20 | Wilmington, Del. | 9 | 20 gr. | 4 " " | " | 4 days, self cure. | Hypo. and sniff. | " | " | Drowsy, cramps, weak. | " " |
| 29 | 9.0 | - | - | N. Y. | - | 7 | H. | 18 | Brooklyn, N. Y. | 10 | 15 gr. | 3 " " | Misery and illness; med. | None. | Hypo. | " | " | General weakness. | " " |
| 30 | 9.0 | - | - | Del. | - | 0 | H. | 25 | Wilmington, Del. | 1 | 8 gr. | 4 " " | Associates. | " | " | " | " | Weakness. | " " |
| 31 | 9.0 | - | - | Del. | - | 0 | C. | 19 | Wilmington, Del. | 3 | 10 gr. | 8 " " | " | " | " | " | None. | Nervous, giddy and weak. | " " |
| 32 | 12.5 | - | - | Md. | - | 5 | H. & C. | 22 | Wilmington, Del. | 6 | 12 gr. | 7 " " | " | Self cure. | " | " | Moderate. | Abst. symptoms. | " " |
| 33 | 11.6 | 9 | 14 | Va. | - | 7 | M. & H. | 17 | Brooklyn, N. Y. | 6 | 35 gr. | 2 " " | Associates and medication. | Workhouse. | " | Neg. | " | " | Negative. |
| 34 | 9.6 | 9 | 10 | Va. | - | 3 | H. | 20 | New York City. | 7 | 20 gr. | 5 " " | Associates. | None. | " | " | Excess before drug addiction. | Good. | 1 arrest for selling whiskey without license. |
| 35 | 11.5 | - | - | Mass. | - | 8 | M. | 19 | Boston, Mass. | 8 | 10 gr. | 4 " " | " | Mass. State Hosp. | " | Pos. ven. | Moderate. | Abst. symptoms. | 4 mos. for larceny. |
| 36 | 8.7 | 8 | 9 | N. Y. | - | 6 | H. | 17 | Brooklyn, N. Y. | 6 | 20 gr. | 20 " " | " | War Hosp., 3 mos. | Hypo. and sniff. | Neg. | " | Good. | Negative. |
| 37 | 12.4 | 9 | 14 | N. Y. | - | 5 | M. | 22 | New York City. | 2 | 8 gr. | 4 " " | " | Workhouse. | Hypo. | " | None. | " | Workhouse hosp., use of drugs. |
| 38 | 8.5 | 8 | 9 | Rumania. | - | 1 | H. | 24 | New York City. | 5 | 8 gr. | 5 " " | " | None. | " | " | " | Abst. symptoms. | N. Y. C. pen., use of drugs. |
| 39 | 11.1 | 9 | 14 | N. Y. | - | 2 | H. | 17 | New York City. | 7 | 15 gr. | 4 " " | " | Met. and Bellv. Hosps. | Sniffing. | Pos. ven. | " | " | None given. |
| 40 | 14.8 | 12 | 16 | Denmark. | - | 6 | M. | 24 | New York City. | 5 | 20 gr. | 4 " " | Used on doctor's advice. | 4 cures. | Hypo. | Neg. | " | Good. | Negative. |
| 41 | 9.5 | 9 | 10 | Conn. | - | 3 | H. | 18 | New Haven, Conn. | 13 | 10 gr. | - | Associates. | None. | Sniffing. | " | " | Abst. symptoms. | 1 arrest and fine, disorderly conduct. |
| 42 | 15.8 | 14 | 18 | N. Y. | - | 8 | H. | 20 | New York City. | 2½ | 12 gr. | 3 " " | " | Blackwell's Isl. | Hypo. | " | " | " | Blackwell's Island for use of drugs and cure. |
| 43 | 14.0 | 12 | 14 | N. Y. | - | 8 | H. & M. | 19 | New York City. | 6 | 12 gr. | 6 " " | " | Metropol. Hosp. | " | " | Moderate. | Weak. | 2 wks. in jail, disorderly conduct. |
| 44 | 13.1 | 10 | 14 | Penn. | - | 8 | O. | 20 | New York City. | 12 | 24 gr. | 12 " " | " | 2 self cures. | Smoking. | Pos. ven. | Excessive use to break drug habit. | Abst. symptoms. | Negative. |
| 45 | 16.7 | 14 | 18 | Canada. | 10 | 10 | M. | 20 | New York City. | 9 | 9 gr. | 3 " " | " | Metropol. Hosp. | Hypo. | " | None. | " | 10 days for disorderly conduct. |
| 46 | 13.3 | 12 | 14 | Mass. | - | 11 | M. | 19 | Boston, Mass. | 6 | 14 gr. | 4 " " | " | Bondville Hosp. | " | Anthrax. | " | Normal. | Arrested for possession and use of drugs. |
| 47 | 11.3 | 9 | 14 | Ala. | - | 4 | O. | 17 | Brooklyn, N. Y. | 7 | - | 2 smokes daily. | " | Self cure. | Smoking. | M. tub. | Moderate. | Abst. symptoms. | Arrest and conviction for drug addiction. |
| 48 | 15.0 | 14 | 16 | N. Y. | - | 8 | H. | 18 | Brooklyn, N. Y. | 4 | 12 gr. | 4 doses daily. | " | Self cure. | Hypo. | Neg. | None. | Normal. | Arrest and conviction for use of drugs. |
| 49 | 13.6 | 10 | 16 | N. Y. | - | 1 | H. | 25 | New York City. | 3½ | 20 gr. | 5 " " | " | Self cure. | Sniffing. | " | Excessive use before drug addiction. | Abst. symptoms (recovering). | Negative. |
| 50 | 8.3 | 6 | 12 | N. Y. | - | 0 | O. | 18 | New York City. | 12 | - | Several smokes. | " | Self cure. | Smoking. | " | Heavy present use. | Sleepy. | " |

* M.

† H.

‡ C.

addicts appearing before the Recruit Medical Examining Board does not vary strikingly from that of normal draftees. The average for the group and the median (ignoring fractional parts of a year) both lie in year 12.

It is estimated by the Division of Psychology that the average soldier rating is year 14. While at first it might appear that drug addiction correlates closely with mental inferiority, a comparative examination of drug-addict scores with ratings of men of their own social and educational group would reveal that there is no striking intellectual inferiority. The occupational and industrial histories of these men show them to be, in the majority of cases, unskilled or poorly trained workers, whose schooling, in more than half the cases, did not extend beyond the fifth grade. The mental ratings of healthy men within this industrial-educational group is probably not much (if at all) higher than that attained by the average drug addict.

The basic year and upper limit as designated in the table seem to indicate that there is no unusual scatter along the scale. The appearance of wide scatter, had it occurred, would usually have been taken to be symptomatic of either a psychotic condition, an attempt at malingering, or of a failure on the part of the subject to co-operate in the work of the examination. On the other hand, a gradual dropping off on the scale is assumed to be indicative of perfectly normal mental registration. The "basic year" and "upper limit" columns, if significant at all, show, therefore, that striking mental deterioration has not yet set in in the variety of cases constituting this group. (*Note.* — Where basic year or upper limit are not registered the scale used was either Performance or Beta.)

Years in United States. — Ten of the 100 cases here reported are foreign born; the remainder are native born. The percentage (90 per cent) remains about constant when larger numbers of drug addicts (not here reported upon) are considered. The cases here presented were contributed for the most part by two army drafts, one "white" and one "negro," the exact numerical strength of which it would be difficult to register accurately. It is estimated, however, that the drafts were of equal size. Upon examining the original data sheets (after completing the tabulation) we find the distribution of cases according to race to be: white, 50; African, 50. To compare the incidence of drug-addiction in the two racial groups would necessitate as preliminary a line of geographical demarcation, for it has been found that cases come in groups from certain

urban localities and are comparatively rare in other cities. The drug addict from a rural community seems to be the very rare exception.

Schooling. — More than half of the subjects here reported upon advanced no further than the fifth grade in the elementary schools; 26 per cent are elementary school graduates; 8 per cent of the total number reached the high schools. Two in one hundred graduated from a secondary or professional school.

Drug.

| | |
|--|-----|
| Addicted to use of heroin exclusively, | 42 |
| Addicted to use of morphine exclusively, | 20 |
| Addicted to use of opium exclusively, | 8 |
| Addicted to use of cocaine exclusively, | 2 |
| Addicted to use of heroin and some other drug, | 28 |
| <hr/> | |
| Total, | 100 |

Manner of taking Drug.

| | |
|--|-----|
| By hypodermic injection, | 64 |
| By sniffing, | 16 |
| By hypodermic injection and mouth, | 12 |
| By smoking, | 8 |
| <hr/> | |
| Total, | 100 |

One man smoked \$4 worth of opium per day. By the hypodermic method one took two, five took three, eleven took four, and four took six doses per day; another took 25 shots in one day. By sniffing, the highest doses per day were three in number. By the combination of sniffing and injection of heroin, respectively, three adults took eight doses of each, and one took twenty doses of each in a day.

Daily Dose. — The relationship between age of habit and daily dose immediately suggests itself as a worth-while problem. On the face of the available data, however, no positive conclusion can be drawn as to the measure of interrelation, for the reason that in the vast majority of cases the daily dose is regulated artificially by the limitations of the individual subject's purse. The personal histories of these men reveal the fact that the drug addict usually regulates his budget affairs with a minimum expenditure allowance for the everyday requirements of living, and a correspondingly definite sum for indulgence in his drug. Though the average drug addict would not admit that

his habit is an indulgence, the fact remains that the daily dose is usually determined by the funds available after food and shelter have been secured. The low dose per day was, for morphine, 5 grs.; heroin, 4 grs.; cocaine, 10 grs. The high dose per day was for morphine, 30 grs.; heroin, 60 grs.; cocaine, 10 grs.

Age at which Habit was contracted. — Of drug addicts within the old draft age limits twenty-one to thirty-one, 72 per cent contracted the habit before they were twenty-one years old. The average falls at 19.6 years; many began at sixteen, and the oldest in group at twenty-six.

Manner of Contracting. — Ten per cent of the 100 men examined attributed their contraction of the drug habit to medication by professional advice. Eighty per cent admitted they were introduced to drugs by their friends, — their friends very largely being immoral women. The social stimulus seemed in the large majority of cases to be the active agent in propagating addiction. One such addict told of being kept by a widow for immoral purposes, and receiving \$15 per week, which he invested largely in drugs.

Age of Habit. — Of 80 men in this group rejected from the army on account of addiction to drugs —

- 20 had contracted the habit six years prior to this examination.
- 12 had contracted the habit seven years prior to this examination.
- 12 had contracted the habit nine years prior to this examination.
- 10 had contracted the habit ten years prior to this examination.
- 20 had contracted the habit five years prior to this examination.
- 6 had contracted the habit twelve years prior to this examination.

The other 20 cases vary widely in this respect (from one year to thirteen), although the average duration was 6.76 years.

Cures attempted. — Of the 100 men examined, 36 attempted to cure themselves at home (usually under guidance of physician); 36 were subjected to hospital cures (usually by involuntary confinement in institutions); 28 addicts declared that they had never tried to break the habit. The 72 who had attempted cures give a total record of 156 unsuccessful attempts. Before drawing conclusions from these data it should be borne in mind that the figures here recorded are based, in many instances, on nothing more authentic than the patient's own statements; the motive for exaggerating and lying about the degree of addiction and dependence upon the drug was, in the case of those eager to evade military service, a strong one; a bona fide cure would

from the very nature of the circumstances not be likely to come to the attention of the Neuro-Psychiatric Examining Board.

Use of Alcohol. — Teetotalers, 36; moderate users of mild intoxicants, 58 (included in this latter group are 18 who, according to their own accounts, were heavy drinkers prior to their contraction of the drug habit). Six declared that they still drink frequently, — a symptom which immediately aroused suspicions about the reliability of their stories. These cases were held over at the base hospital for observation by the medical officer; 4 were subsequently rejected and 2 accepted for military service.

Disease Histories. — Examination of case histories points to the incidence of venereal disease in at least 38 per cent of the cases; here, again, the true per cent may be somewhat higher, for the source of information in most cases was the patient's own admission or denial. Less than half the total number gave negative histories. There seems to be no distinct connection between the addiction to drugs and hereditary conditions, certainly none that could be obtained from the patients themselves.

Criminal Histories. — The total number of "Yes" answers to the question, "Have you ever been arrested?" was 56. In 18 of these cases the technical charge was that of "addiction to drugs." Excluding arrests and confinements on this charge, there are still 38 who served sentences for criminal offences varying in seriousness from "disorderly conduct" to "manslaughter." In all there were 54 commitments on charges other than that of addiction to drugs.

Sufficient effort was spent on the drug problem by the Intelligence Department of the camp to bring to light a well-established system by which plenty of drugs have been obtainable, both outside of and within the camp. It is entirely a problem for the city, not the country district, although the statement has recently been made that the cutting off of alcohol has tended to increase the consumption of drugs in country districts, and especially in the cities of the South.

As time slipped by evidences arose which bespoke a deliberate attempt to foster and, worse yet, to increase the drug habit for the express purpose of obtaining for the victim a discharge from the army. So many recently acquiring the habit appeared for examination that suspicions were aroused, and enough was found to establish definite propaganda in this direction. As a solution, a purely local one for the metropolitan district of Greater New York, it was suggested by the writer to the City

Board of Inebriety that all drug addicts from New York City be accepted, temporarily at least, for service. By a suitable arrangement such men could then, by military order, be sent to the institution for drug addicts. Here they might well remain as long as necessary for proper observation and classification.

This institution already in existence, and with a fairly complete system of records amplified by possibilities of social service investigations, could readily cull out the old offenders, who might be returned to camp for discharge from the army. The more recent cases, who might be open to cure under proper treatment, could be returned for duty and sent quickly beyond the likelihood of obtaining the drug. Certainly, if such procedure in such an institution cannot cure such an addict, the army will prove, by the same token, unable to make him a soldier.

Viewed from any angle at this time the problem appears to be very largely a civil one, and must take into consideration numerous social factors of extremely baneful influence, and which bring their compelling force to bear at a most unfortunate time of a young man's life.

FURTHER OBSERVATIONS ON NEUROSYPHILIS AND THE PSYCHOSES.*

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Syphilis of the nervous system has been attracting considerable attention from syphilographers of late, so much so that at the present time the journals are full of reports dealing with spinal fluid findings in cases of secondary and latent syphilis, in many cases with remarkable serologic evidence of invasion of the central nervous system with or without definite neurologic signs. Many represent latent cases of paresis or cerebrospinal syphilis, in which the invasion by spirochete and alterations in the spinal fluid occur a considerable time before we have any clinical evidence of such invasion. Cases of this type are much more frequently seen in the out-patient department of general hospitals, or in the practice of a syphilographer, than they are in nerve clinics or in the out-patient department of the psychopathic hospital. As mental symptoms are usually absent, such cases are only rarely seen in the State institutions.

On *à priori* grounds we should, I think, expect to find a great many more mental cases than we actually do, with laboratory evidence of syphilis of the nervous system and a psychosis of a type not usually associated therewith. This expectation is based on the fact that so many cases are now being reported in which, despite the absence of any clinical symptoms at all, there is laboratory evidence of invasion of the central nervous system during the secondary or somewhat later stages of syphilis. In mental cases, however, it has been amply shown, in statistical and other reports on syphilis, Wassermann reactions and spinal fluid examinations, that this does not frequently occur, and we find only rarely cases that, for example, show a dementia præcox picture and have the serologic findings of neurosyphilis. That this is not due to the fact that syphilis does not occur in dementia præcox is shown by my own observations that 5 per

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cent of 240 cases of dementia præcox showed a positive Wassermann reaction in the blood serum (spinal fluid examinations negative), and this finding is amply borne out by the statistics of other observers at other institutions. Of importance, also, is my further finding that among 1,500 non-paretic, non-cerebro-spinal syphilis cases admitted at Danvers State Hospital, some 7.5 per cent gave a positive Wassermann reaction in the blood serum, but very few of these showed also any changes in the spinal fluid. Accordingly, we must adhere to the view that mental symptoms associated in a given case with signs of invasion of the central nervous system by syphilis must be attributed to the latter. If this were not true, then we should expect to find relatively large numbers of cases showing heterogeneous types of mental symptoms associated with the serologic findings of neurosyphilis, just as we now find so many cases without any symptoms whatever associated with the serology of neurosyphilis. The mechanism of the causation of these atypical cases must remain in doubt until a sufficiently large group has been collected and subjected to rigorous clinical and post-mortem examinations to make the relationship clear. In some cases, granted that the association is that of cause and effect, it is fairly clear that the psychotic symptoms are the result of a particular disease agent acting on a particular type of personality.

In a paper published in 1917¹ I reported eleven cases of neurosyphilis showing divergence in the clinical and serologic pictures. Since that time Southard and Solomon have published a book² in which they have presented a considerable group of such atypical cases. Smith and I have published a paper³ dealing with two cases of degenerative chorea, in which the serologic findings of general paresis were present, one of these having been discovered since the publication of the first paper mentioned. Myerson⁴ has also presented a group of atypical cases.

Hoch⁵ recently reviewed my article, pointing out that certain of the cases therein were probably examples of that type of psychosis associated with neurosyphilis, first described by Plaut and called by Kraepelin "syphilitic paranoid condition." Shortly after I published my previous paper I became aware that such a group had been described. While it is difficult to be entirely certain in the cases quoted in my earlier paper of the relationship to this group of cases, I am inclined to agree with Hoch in his placing of certain cases there presented.

The cases to be presented at this time fall into certain definite groups. Group 1, comprising six cases, represents a group of

paranoid psychoses. Cases 1 and 2 possibly represent the above-mentioned type of syphilitic paranoid, although in each case we have a history of the use of large amounts of alcohol preceding the onset of the psychosis. In case 3 a paranoid personality seems to have developed into a mild psychotic state under the influence of neurosyphilis. Case 4 developed an interesting transformation of the personality in the midst of a typical paretic excitement, thus apparently confusing the issue with respect to the paranoid types of neurosyphilis.

Cases 5 and 6 are very obscure. In each case we deal with a paranoid condition of rather unusual type associated with serologic findings which are not conclusive evidence of neurosyphilis. The propriety of including such cases may be questioned, but since they illuminate points in connection with the discussion of the relationship between paranoid psychoses and neurosyphilis, and in connection with the diagnosis of neurosyphilis, they have been included.

In group 2 there are five cases of the manic-depressive reaction type, in case 11 the diagnosis of neurosyphilis being uncertain. Case 10 is clearly not an association of manic-depressive psychosis with neurosyphilis, but a paretic case in which intensive treatment produces remissions of an extraordinary type — justifying inclusion with the group. Group 3 contains two feeble-minded cases, — one with serologic findings of neurosyphilis, probably congenital, and the other with serologic findings of probable neurosyphilis. Group 4 contains four cases with neither psychotic symptoms nor clinical evidence of neurosyphilis. In three cases there was conduct disorder, probably determined by so-called constitutional inferiority. In case 16 there was an interesting increase in serologic findings under treatment.

In addition to these groups there is one case showing increase in serology during treatment, and one case, by way of contrast, of pseudoparesis.

Analysis of the clinical signs and symptoms of neurosyphilis shown in all 19 cases reveals the interesting fact that in only 4 cases could the diagnosis of neurosyphilis be made without the evidence of the lumbar puncture and Wassermann reactions. In one additional case an improper diagnosis of neurosyphilis could be refuted only by such evidence. In four cases the clinical evidence is nil and the serologic evidence equivocal. Accordingly, of the 14 cases of undoubted neurosyphilis here reported, only 4, or 28 per cent, present clinical evidence of the syphilitic condition present. To be sure, the cases in the group are un-

usual from any point of view, but the inevitable conclusion to be drawn is that any case with nervous or mental symptoms of any type may have non-symptomatic or atypical symptomatic neurosyphilis, and all such cases should, in the absence of contraindications, receive lumbar puncture.

CASE HISTORIES.

Group 1. Paranoid Cases.

CASE 1 (File No. 10847). — Alcoholic, drug-using prostitute, a victim of conjugal neurosyphilis. Psychosis characterized by auditory hallucinations, delusions, depression, hypokinesia; clearing to an hallucinated state, with defective judgment and considerable reaction to hallucinosis. Treated.

History. — A woman, aged thirty-four, was sent to the hospital in 1918 with the statement that for two weeks she had had delusions that men were coming up the front steps and talking about her, saying they would enter her room and kill her. The patient said she had been ill since December, gradually becoming depressed, and of late had heard voices. She admitted the use of morphin, heroin and cocain for seven years, and the use of considerable quantities of alcohol for at least fifteen years. Her responses to questions were very slow; she moved very little and then very slowly. She would answer very few questions regarding her hallucinations. At times her lips would tremble, as though she were trying to speak, but words would not come. She was worried and felt depressed. She recognized the voices, but could not tell whose they were or what they said.

A history was obtained from her husband, who was recognized to be a paretic from his memory defect, speech defect and expressionless face. (Later the husband died in the hospital of paresis, having been under treatment for some months.) He said that the patient had been a prostitute since the age of sixteen, continuing so during her married life. They had been married for ten years, for two years of which the husband did not work. She had used alcohol for many years, going on sprees once or twice a month. He agreed that for about seven years she had used drugs. He noted the first change in the patient about Easter time, 1918, when she remained in bed one day and said she was gone, that she would not live any more, and might as well take poison. She then began saying that people had no use for her and were going to kill her. The voices would say, "She is no good, she is rotten." She had some swelling of the leg, but from this she recovered. She was blue, depressed; would sit or stand for hours and was very inactive. The husband threw away the drugs and she had had none for some time before entrance.

Examination. — Physical examination revealed nothing remarkable. The tongue and hands were slightly tremulous. The facial lines were obliterated. All reflexes were normal, including the pupils. There was

marked cyanosis of the hands, with blanched nails. There was a considerable degree of pyorrhea.

Course and Treatment. — She had hallucinations, hearing voices threatening her, calling her bad names, and accusing her of all sorts of immoral practices. When she became slightly more accessible she gave a history of gonorrhea and syphilis, and admitted having had hallucinations in 1917. Her memory was only fairly good. The speech was hesitant and much retarded. Questions frequently had to be repeated. She believed that people spied on her; published vulgar things in the paper; that they had tried to poison her. She was certain that she must die. A voice accused her of all kinds of sex perversions, which she admitted were true. She claimed to be depressed, but seemed really to be rather indifferent to her painful ideas. She did not answer the voices directly. There seemed to be blocking, especially regarding the content of her hallucinations. This condition continued for about three months, during which time she was under intensive antisyphilitic treatment. She then gradually became lively and alert, noticing everything that went on around her. She had hallucinations constantly, the voices often saying terrible things to her, many times so absurd as really to be amusing. She referred her hallucinations to people who were going along the road outside the hospital. She was somewhat silly, and at times was quite elated. Occasionally she would become very profane in reaction to the voices. Very frequently she would suddenly remark, "It is not true, Doctor, what they say about me; I didn't do that," indicating that the voices did not talk to her directly, but talked about her. She had some insight into her past condition, but thought she was well at the time. In the later months there were no longer any tremors or any cyanosis.

She was eventually transferred to the Boston State Hospital where she now is. Active hallucinosis has continued, despite treatment.

At the time of admission the Wassermann tests on blood and spinal fluid were positive. In the spinal fluid the protein was increased; there were sixteen cells, and a gold reading 5554444322. There were tremors of the hands and facial muscles, and an ironed-out expression. These latter symptoms, plus the serologic findings, were the only positive symptoms of syphilis of the nervous system. The other symptoms were more typically those of an alcoholic hallucinosis, or of dementia præcox, and in the absence of serologic findings the differential diagnosis between these two would be very difficult. A recent spinal fluid examination showed a lessening in the intensity of the reaction.

CASE 2 (File No. 13430). — An alcoholic man, aged thirty-six; acquired syphilis eighteen months ago; vigorous treatment. Psychosis characterized by vivid, threatening auditory hallucinosis with delusions of persecution. Wassermann reaction on blood and spinal fluid, negative.

Serology otherwise typical. Treatment; recovery from the psychotic state in a few weeks.

History. — The patient, a man of Irish descent, was brought to the hospital by the police, with the statement that he had been bothered by the influence of neighbors, who had some sort of an instrument by which they could read his thoughts, control him so he could not talk, etc. This instrument enabled them to see right through the walls. He stated that this had been going on for six months. He seemed quite concerned about his persecutions. His emotional tone was in accord with the delusional content. He was accessible and co-operative, with no memory loss. He said, "I can't dope it out. I know it sounds like a crazy man, but these people can make a suggestion and then make me carry it out. When I was in Maine they had me in a hypnotic trance."

History obtained from the wife revealed nothing of importance in the family history. The patient had had some education, and later became a bartender, at which business he had worked until about five years ago, when he became an advertising solicitor. He had been married for thirteen years. His wife, during the past seven or eight years, had worked in order to help support the family. She stated that he had always been jealous, although she gave no cause. He had a cheerful, easy-going disposition, was good-natured, generous, thoughtful, proud, did not like criticism. He read a great deal. Although he was ambitious, he never realized his ambitions. He had always drunk a little, but more during the past winter, when he would become intoxicated. He stopped drinking May 1. He turned against his wife last spring and has had no marital relations since. He became irritable.

In July he first stated that people were after him, and since that time he had complained of delusions of persecution. He finally refused to speak to any of the neighbors, thinking they were hired to annoy him. At times he thought that his wife was behind the plot. Once he threatened to kill his wife, his son and himself, but made no attempt. For about two weeks he smiled to himself, and his lips moved as though he were talking. He would start to answer questions and then hesitate. He complained of pain in his head.

On the day of admission he was yelling, saying that the roof of his head was going.

The patient himself gave a history of excessive alcoholism extending over a period of several years, and a definite history of a primary syphilitic lesion a year and a half before. He received active antisiphilitic treatment at a general hospital. The Wassermann reaction became negative and remained so.

On mental examination, he was oriented and there was no history of disorder of consciousness. There was no obvious disintegration of the personality; no memory loss. The emotional tone seemed quite in keeping with the delusional content. He was worried because of the persecutions. He claimed to feel depressed, and had outbursts of irritability against people who he thought might be in league with his persecutors.

His hallucinations and delusions commenced six or seven months before entrance, following a spiritualistic seance which he attended in May. His hallucinations were auditory; the phonemeta were about him, referring to him in the third person, but occasionally the voices talked to him directly. They were chiefly Catholics. What the ultimate motive was he could not determine. They had some sort of an electro-magnetic machine which affected him through sound waves. The persecutors could control his thoughts and every activity. His will was under their complete domination. He was quite accessible and co-operative, and showed no conduct disorder. He was normally active, and there was no disorder of thinking.

Examination. — On physical examination he was found to be well developed and well nourished. The pupils were equal, regular in outline, and reacted normally to light and accommodation. All deep reflexes were present and brisk. There were no abnormal reflexes. General visceral systems normal. The Wassermann reactions on the blood and spinal fluid were negative to several tests. Spinal fluid showed protein increase, 8 cells, and a gold reading 5555321000.

Course and Treatment. — Within six weeks of his admission the patient had entirely recovered from his psychosis. He stated that his past experience had been a vivid dream, and claimed that the voices he heard and the ideas of persecution were all due to his imagination. He was pleasant and agreeable, quite tractable. He worked well and assisted with the general work around the hospital.

He had, in the meantime, received very vigorous intravenous and intraspinal treatment, and at the end of six weeks was allowed to go home on a visit, where he still is, getting along quite well.

Without the complication of neurosyphilis this would be regarded as a case of acute alcoholic hallucinosis. The patient's history of having used alcohol excessively up to a quart of hard liquors a day, combined with the onset of the psychosis shortly following the time when he stopped drinking, as well as the clinical characteristics of the psychosis, would all indicate this diagnosis. The ideas of influence, however, and of control were unusually marked for an alcoholic hallucinosis case. It should be noted that the syphilitic paranoid conditions are very closely allied in symptomatology to alcoholic hallucinosis, and that in both disorders we have to do with an active hallucinosis on which are founded delusions. Of course, in this case the diagnosis of neurosyphilis would be equivocal were it not for the clean-cut history of a primary lesion from a general hospital with resulting treatment, which produced a negative Wassermann reaction.

This case also emphasizes a point for the syphilographers,

namely, that a negative Wassermann reaction in the blood serum is not always evidence of a thorough cleaning up of the syphilitic infection. As will be shown in another case, the negative Wassermann reaction in the blood serum may persist for a long period during which the spinal fluid findings are positive and may even become more marked. It may be noted here that the writer has had personal experience with one case in which the blood and spinal fluid Wassermann tests were persistently negative over a period of three years, although all the other spinal fluid findings were positive and the case was typically paretic from a clinical point of view. Eventually, under intraspinal treatment, the spinal fluid Wassermann test became faintly positive.

CASE 3 (File No. 10373). — A man, aged forty-two, of paranoid personality, with syphilis possibly four years previously, became quite suspicious and mildly psychotic. Improvement under treatment.

History. — This man was referred to us from a general hospital because of certain paranoid ideas, together with a positive history of syphilis, leading them to suspect syphilis of the nervous system. In 1898 the patient's right eye was injured by the explosion of a firecracker. In 1906 he had been operated for double hernia and appendicitis. In February, 1916, he fell from a platform and injured his back. Roentgenograms taken at a general hospital led to the patient's being told that he had a slight fracture of the fifth lumbar vertebra. In 1915 he had gone to a general hospital for a sore throat and a sore on his right shin. A positive Wassermann reaction was found, and he received five doses of arsphenamine. At the time of entrance, March 14, 1918, the patient complained that his back and left arm felt numb, and that he was troubled with headache.

The mental examination showed that the patient was clearly accessible. He gave a good history of his family and of his own life. He had worked in an express office for many years, remaining twenty years in one office. He remained there so long because he lived with his mother and did not care to leave her. From 1911 to 1913 the Catholics in this town were against him because he was a Mason, and tried to run him out of town. He thinks they eventually succeeded in ruining his business, so he came to Massachusetts in 1913, and took a place in Boston in an express office. Here the men in the office soon began to make him the butt of their jokes and they began to do many things which irritated the patient; they would throw things at him and would take his chair from under him. More annoying even than this was the way in which they would change chairs for him. When he was out his chair would be taken and another one substituted. Many things of this sort were done, and he believes they talked about him and reported him to the foreman. He was quite circumstantial in telling this story. No disorder of articulation or of emotions appeared. He was quiet and co-operative. He described him-

self as having always been social, not seclusive or shy, easily angered, always the butt of jokes.

Examination. — His headaches, backaches, numbness and pains in his legs continued, and the physical examination showed an injured eye, a small mass in the occipital muscles, a stiff lumbar spine without curvature, without any pathology in the neurologic condition. The urine was negative. The spinal fluid showed globulin 1, albumin 2, gold 0012333100. The Wassermann reaction on the serum was positive, on the spinal fluid, negative.

The patient has since been under treatment with improvement in the serologic findings. He has frequently visited me to talk about his complaints of one sort or other, usually physical, and has manifested a great deal of interest in the state of his health. He always asks for diet lists, and as to the advisability of his doing various things which he feels might in some way impair his health. To some extent the petty persecutions in the office have stopped. Whether this represents a lessening of the very mild paranoid strain, I cannot say. He is apparently not quite so suspicious of people as formerly, for when he was in the hospital he was definitely suspicious of many people whom he saw.

This case possibly represents a very mild type of the syphilitic paranoid condition described by Kraepelin, in which, however, hallucinations are absent.

CASE 4 (File No. 11177). — Typical case of general paresis, developing marked auditory hallucinosis and transformation of the personality.

This case differs from the others in that this man presented all of the clinical symptoms of general paresis, including Argyll Robertson pupils, hyperactive deep reflexes, slight speech defect, defect in calculation ability, judgment defect in practical matters, ideas of grandeur, restlessness and memory defect, together with the following serologic findings: Wassermann reaction, blood and spinal fluid, positive; protein increase, 12 cells, and a gold reading 5555444321.

Why, then, should such a typical case of general paresis be presented in a series such as this? For the following reasons: At the time of his first admission in August there were no hallucinations and had been none. He was out for four days on a visit in October, during which time his behavior was typically that of a grandiose paretic, and shortly after his return he became more and more restless, irritable and even violent, and about this period became actively hallucinated. He heard God's voice telling him that the physicians and nurses were to be killed. He also heard the voice of Jesus Christ and carried

on long conversations with God and Christ somewhat later. The hallucinations continued, and he became convinced that he was Jesus Christ, and damned every one in his vicinity to hell, and later still came the idea, of variable intensity, that he was God. From the time of his admission on he had been under intensive treatment, and at one time developed a jaundice which interfered with the treatment for some weeks, during which period he became hallucinated. During all of this excitement and great expansion of the personality he still recognized those about him.

I cite this case because of its importance as showing that hallucinations can and do exist in general paresis, and that delusions, based thereon, may also occur, in addition to its bearing on the general question of the causal relationship between neurosyphilis and paranoid states, where the two co-exist. *If such a state as this may occur in otherwise typical paresis, then obviously neurosyphilis should be able to produce such a state without concomitant distinct signs of paresis.*

CASE 5 (File No. 13364). — A school teacher, aged forty-nine, always queer, with a love fantasy dating back twenty years, and a paranoid psychosis of some years' duration, showing a curvature of the spine, possibly tuberculous in origin, with equivocal spinal fluid findings.

History. — The patient was sent in by order of the court for observation. At the time of admission she was mildly excited by the experience, but showed an intelligent understanding of the situation. She stated she had had two operations within two months, and three days before had left a convalescent home. She denied any ideas of reference, delusions of all kinds and hallucinations. There was no dizziness, headaches or seizures. She was a teacher, lived alone, and for the last twenty years had worked irregularly.

Outside history was obtained with some difficulty, but it appeared that for many years she had been kept on the list of substitute teachers, because her work was not very satisfactory and she was hard to deal with. She was always dissatisfied with the way she was treated, and was antagonistic toward the children. In high school the patient had been regarded as rather stupid, quiet and a little odd. She had taught school regularly for six years, and then as a substitute for twenty years. When she stopped her regular work, twenty years before, she ordered a trousseau from one of the stores, and announced that she was going to marry a physician who had never heard of her. Since that time she had been regarded as queer, but no one had thought that she had especially deteriorated. She had been known for rather queer religious beliefs, and for belief in spiritualism, and had told of visions and of illuminated pictures, but did not mention voices.

Twenty years ago she was at the Boston State Hospital for ten weeks, where a diagnosis of hebephrenia was made.

Examination. — On mental examination, the patient was courteous, very co-operative, but not freely accessible regarding her delusional ideas, which she tended to regard as sacred. From her we learned that she was an illegitimate child, that she was cared for by her maternal grandparents until the age of five, when an aunt by marriage took her and abused and mistreated her. She was then taken by some people who became her foster parents. She really knows very little of her family. As a child she was happy. She went through normal school. Her memory, in general, was good. School knowledge was well retained. Although she had taught for many years, she found it rather hard, as the discipline was difficult for her. She regarded herself as a recluse. Diffident and bashful as a girl, easily embarrassed, she made very few friends. She did not mix well. She never cared for ordinary amusements; had never gone to shows or theaters; did not care for dancing, cards or sports of any kind. She called herself a bookworm. She usually read books on sociology and religion. She had never been subject to blue or depressed periods, and was not quick tempered. She was brought up a Baptist, but had changed her religious views since.

At about the age of twelve it was noticed that she had a curvature of the spine. At fourteen a plaster cast was applied, and she wore it about three months. Later she had a support and a shoulder brace, which she had worn most of the time since. Eight years ago a small tumor was removed from the right breast. Six weeks ago another tumor was removed, and later, because of excessive menstruation, a curettage was done. She insisted strongly on returning home, and did so. The doctors visited her at her home and sent her here for observation.

The central feature of the case was a delusional idea which the patient gave up with much reluctance. She insisted that the examiner and every one in the universe knew about that with which she had to contend. If the examiner did not know, then she did not know, and the whole thing would be imaginary. Twenty years ago something took hold of her and she knew she was loved. She had a wedding dress made, and mentioned having her name changed, and ever since then she had been influenced and had known that she was loved. This kept her from holding positions in the schools, and so influenced the pupils that their behavior was bad and she could not discipline them. This caused her all the misfortune and sorrow she had had, the climax being reached when she was sent to the psychopathic hospital. During the past two years this person had come to her every night and had had sexual intercourse. She enjoyed it, yet she worried about it because she was not sure that she was doing right. If she were in a repellent state of mind he did not come. Up to the age of fourteen the patient performed masturbation, having been taught improper actions at the age of five by a boy. She overcame this and had not performed masturbation since. The patient would like to have married,

and would like to have had a family. She thought that she was always hypersexual when around men. She felt that every one knew this. People looked at her on the street and noticed her. She could not give any reason as to why she thought this was known. She supposed there had been mention of it in the newspapers. She knew where the daughter of the man lived, but would not tell. Aside from this, no delusions were determined; nor was there any certain hallucinosis. She had a religion all her own. Her left hand was consecrated. The thumb signified the right spirit; the finger the right mind; the next the right body and environment; the next her relation with the Supreme Being and others; and the next the right consciousness. The right hand was named "service." The thumb indicated the spirit world. The fingers were called the family. She prayed according to the way she had named her hands. She was a socialist, and believed in spiritualism to a certain extent. She showed no disorder in thinking.

On physical examination she showed some dulness in the lungs; a right upper thoracic scoliosis. Neurologic examination was entirely negative. The blood and spinal fluid gave a negative Wassermann reaction. The spinal fluid showed increased protein, 3 cells, and a gold reading 5555511100.

Here, then, we have a patient always seclusive and odd with a definite sense of inferiority, due to the fact that she was an illegitimate child, with a diagnosis of hebephrenia twenty years ago at a State hospital. She had scoliosis and possible tuberculosis of the lungs. She was sent to the psychopathic hospital because of delusions, chiefly of a sexual nature and of a spiritual-lover. The Wassermann reactions were negative, but there was a typical paretic gold curve and an increase in the protein content. The cause for the spinal fluid findings is obscure, and the relationship between these findings and the psychosis is still more obscure. The chances are, of course, that there is no relationship, and that the organic disease indicated by the spinal fluid findings has yet to produce symptoms.

How are the spinal fluid findings to be explained? The positive findings were: albumin and globulin increase and the gold reaction. In the absence of clinical signs to aid us, we can only say that such findings indicate an inflammatory reaction in the nervous system. Such a gold curve is often regarded as typical for paresis, but this is not invariably true. While a negative Wassermann reaction in the blood and spinal fluid is not conclusive evidence against syphilis or paresis, it is a very rare finding. Furthermore, provocative arsphenamine injections produced no change in these reactions. Under the circumstances, we can only record the case and await developments.

CASE 6 (File No. 12636). — A single woman, aged fifty-one, apparently always reserved, and possibly somewhat peculiar, with some character change and economic failure four years previously. Psychosis very mild in type, characterized by probable auditory hallucinosis, and some delusional formation based on that. Patient anemic. Slight spinal fluid changes, probably not neurosyphilitic, but origin uncertain. Rapid improvement in mental condition. Discharge. No antisiphilitic treatment.

History. — The patient was admitted to the hospital with the statement that for six weeks she had had delusions of persecution and auditory hallucinations. She believed that the instigators were people who lived above her, who wished her room for a friend, and that the landlady was also involved. She called in a priest the night before to rid her room of devils that infected it. She wandered about during the night disturbing the house and did considerable screaming as though frightened.

On admission she was quiet, accessible, co-operative; approximately oriented as to place. She talked fairly clearly.

The history was obtained from a niece, who had heard from her mother that the patient had always been queer. She was constantly irritable, and after knowing persons a week or two would imagine that they were conniving things against her. She was never good natured or happy; she was melancholy and thought of unpleasant things. She was a malicious gossip, telling untruthful, slanderous tales about people she knew, saying that the women went with men immorally, etc. She had a vicious temper. Eight years ago she bent her sister's back across a railing almost injuring her. She was said to be very untruthful and jealous. She went to the theater and read love stories constantly. She was usually very haughty with men, but had had a mild love affair years ago. She had no friends and hated the world. This niece was the only person with whom she could get along, and of whom she was fond, although the patient also slandered the niece.

The patient had apparently led an uneventful life as a saleswoman until four years ago, when she was said to have given up work, hung around the house, worried continually about her physical condition, and saw many physicians. These found nothing wrong, except that she was anemic. Two years ago she had a peculiar spell of short duration and then became more queer than ever; she neglected her house and lost interest in everything. She would sit shaking her head and thinking for a long time; began to talk in a slow, drawling way, and became pale and thin. Often she would not answer questions, and would laugh in a silly way over things that were serious. She said that people were calling her names. She showed no fear, and gave no explanation for the voices. She was naturally reticent and seldom explained her thoughts. She said the people upstairs were peeping down on her; that men were going in her window and were under her bed. She continued to gossip and make trouble, and would write letters to do so. She once threatened her aunt, saying she would shoot her.

For about three weeks the patient had been eating very little and prob-

ably not sleeping much. She had become very thin. A day or so before admission she said a twenty-one-year-old boy who lived in the same house that she did had promised to marry her. She ran after him, so that he refused to come back to the house.

There was no history of fainting attacks, convulsions or shocks. Memory was unimpaired. No dizzy spells or headaches; no periods of confusion had been experienced. For two years she had thought that men looked at her on the street because she was so good-looking. It was said that shortly before admission she talked a great deal about the devil; ran up and down the steps with no clothes on, and did a lot of silly talking. A doctor was called and she was brought to the Boston State Hospital.

Examination. — The patient denied the majority of the statements given in the outside history, and those she admitted she explained away. She was sure that she had been quite nervous recently, and that this began from sheer hunger because she had no money. She denied the love affair with the boy. She said that she had commented on his good manner and on his studious habits. She told of a love affair at twenty-two with a man who deceived and wronged her, and then deserted her. It was not possible to get any slanderous remarks from her about any of the neighbors. She admitted that she heard the people upstairs talking about her, saying they wanted to get her out, calling her names, stamping on the floor so as to make it uncomfortable for her; also that she called the priest to bless her room, thinking it might be devils, but before she was discharged from the hospital she insisted that she was sure there were no devils there. She was at all times quiet, pleasant and agreeable, accessible, courteous. She gave no evidence of hallucinations while in the hospital, and no further evidence of delusion formation.

She was pale. The pupils were thought to react less well to light than to distance, but they apparently reacted normally to both. The heart was enlarged on the left side, and the sounds were weak. The pulse was bigeminal; blood pressure: systolic, 105; diastolic, 70; hemoglobin, 90 per cent. The differential count showed 5 per cent of eosinophils; otherwise it was negative. Urine findings were negative. Spinal fluid globulin 1, albumin 1, cells 2, gold 0000111000.

It is to be noted that in this case there are two conflicting points of view. First, there is the view of the patient's relatives that she has always been queer, and that for four years there has been a distinct change in character, even more marked during the last two years; and, according to the account of the people where she lived, a definite exacerbation during the three weeks preceding admission, with a crisis the night before. A history of this type is, of course, not uncommon in the paranoid psychoses. On the other hand, there is the patient's denial of practically everything attributed to her, although it must be noted that her explanation for the things she admits is practically

always inadequate. The acute episode could equally well be explained on the basis of exhaustion from prolonged undernourishment and anemia. The spinal fluid findings were not marked, but they were definite. Of course, protein increase in the spinal fluid occurs in a wide variety of conditions in which there is some disintegration of nervous tissues. The majority of such cases at this age are syphilitic, neoplastic or vascular in origin. In this case there was no evidence of any one of these three causes, aside from the spinal fluid changes themselves. With the Wassermann reactions on the spinal fluid and blood negative, little stress would be laid on these changes were it not for the fact that occasional cases are seen in which findings of this type are the first indication of neurosyphilis, the spinal fluid findings later becoming more definitely positive and the Wassermann reaction showing positive instead of negative results.

Group 2. Cyclothymic Cases.

CASE 7 (File No. 9391). — Man, aged forty-two, physical and serologic signs of neurosyphilis, psychosis of manic-depressive type. Recovery from psychosis.

History. — This man entered the hospital Sept. 16, 1917. The family history was negative, except for one sister who had had, about 1907, an attack of depression in which she had hallucinations, had ideas of persecution and poisoning, and refused to eat. She was at the Worcester State Hospital two years, and following discharge recovery seems to have been complete.

The patient had a normal childhood. He became a lithographer and for twenty years had conducted a prosperous business of his own. He was married in 1907. His wife died following the birth of the first child. He had never been sick. About seventeen years ago he had had a sore on the penis. He had not been a drinker. He had suffered somewhat from a chronic intestinal disorder, and about two months before admission to the Boston State Hospital he went to a general hospital, where, during the routine examination, his blood Wassermann reaction was found to be positive. About three weeks before admission the patient became very much depressed. He kept repeating that he was gone, was no use to the world, etc. He accused himself of being sinful, and said that other members of the family would be lost because of what he had done; that he had disgraced the family by sexual offences. He was sent to a sanatorium, gradually grew worse and became so markedly agitated that he was removed to the psychopathic hospital.

Examination. — Here he was clearly conscious, oriented and his memory good. He was markedly self-accusatory, and feared that he was to be executed because of his misconduct. Attention was maintained with

difficulty. Flow of thought was very slow, and there was a good deal of retardation. He was much depressed, anxious and agitated.

On physical examination the heart and lungs were found to be normal. The pupils were slightly irregular; the left reacted sluggishly, the right was stiff to light. Knee jerks and ankle jerks were not obtained. There was paresthesia of left leg, fine tremor of the tongue and fingers, and a suggestion of ataxia in his gait. The spinal fluid showed globulin 3, albumin 3, cells 9, gold 5555533331. The Wassermann reaction on the serum and spinal fluid was positive. He was put under intensive treatment. He continued to be depressed and agitated, moaning and groaning. He was markedly retarded. In July, 1918, he was transferred to the hospital department, and since has been released on visit in a much improved condition. Since his release he has been doing some painting, and has improved markedly so far as the mental symptoms are concerned.

It will be noted that he showed physical signs of syphilis of the nervous system, but none of the cardinal mental signs in the way of memory defect, loss of reasoning power, of calculating ability, etc. It was rather a fairly typical picture of a mixed manic-depressive phase. Presumably in time the patient will develop further symptoms of paresis, but for the present it is not possible to say more than that he showed, in the presence of some physical and laboratory signs of syphilis of the nervous system, a psychosis of distinctly non-related type.

CASE 8 (File No. 12482). — Acute maniacal outbreak in a German naval officer with confusion and disorientation. No neurologic signs of paresis aside from slight tremor; good memory; grandiose and euphoric in the most excited stage; recovery from the outbreak in about eight days. Serology of neurosyphilis.

History. — The patient was a German officer assigned to a ship transferred to the United States for use as a troop ship. En route to Boston from Europe he became violent, attempted to stop the ship so that he could take a swim, and started a fire in his cabin which threatened to burn up the ship. He was so violent that he was unmanageable at the Naval Hospital, and was admitted here in irons, talking, gesticulating, spitting in the attendant's face, and struggling to get free. He was disoriented, incoherent, spoke poor English in a harsh voice and was markedly active. During the first three days he was non-co-operative, excited, talkative, incoherent and rather playful. In this phase he gave his name, age and address correctly, and varied his statement of where he was according to his immediate environment. When in the prolonged baths he said that he was in a submarine. He quieted down rapidly, and on the fourth day he was very friendly, was oriented, very observing, would mimic the other patients, was very gracious in his manner, quite talkative and humoristic. Within eight days of admission he seemed to be in a

quite normal condition. He gave a good history of himself and of his past. Retention of school knowledge was very good. He could give a good account of the war. He was somewhat alcoholic, but not more so than is usual.

At the age of seventeen he had a genital lesion for which he received no treatment. In 1915 he had another genital lesion which lasted three weeks. On this occasion he was treated by a syphilographer at the naval hospital in Kiel. He was given four courses of treatment, each consisting of six intravenous injections of arsphenamine and six intramuscular injections of mercury. He received no further treatment. He stated that he was all right when he left Brest. His trouble arose when about three days out. He believed that the chief officer, under whose direction he was on the boat, did not understand him and so made some trouble for him and reprimanded him on two or three occasions. (It is possible he was somewhat too active and this was the cause of the reprimand.) He could not give a clear story of all the events that happened. He denied attempting to stop the boat and to go swimming. He explained the fire incident by saying that he had cut an electric wire in the cabin in order to light a cigarette, as he did not have any matches, and by rubbing the two cut ends together he made sparks with which he lighted a piece of paper, and in that way lighted his cigarette, and in this way, also, the small fire started. At this time he seemed to have no particular delusions, although a day or so later he stated that he was going to return to Germany and purchase a boat with which he would make considerable sums of money. The boat could be bought for perhaps 200,000 marks. He had no money himself, but he was sure that because of his ability he could borrow the money from bankers. He realized that he had had an attack of mental trouble, and probably at the time of discharge was still slightly euphoric. There was at no time any emotional instability. At first his attention was quite distractible, but later it became normal. Where he had shown flight of ideas in his more violent phase, his ideation became of normal range, as did his motor activity.

Examination. — Physically he showed numerous small scars from acne all over the body, a slight tremor of tongue and extended fingers, a slight swaying in Romberg's position. The knee jerks were equal and within normal range. The pupils reacted to light and distance, and were described differently at different times. They were equal, were said at one time to react sluggishly to light, the right better than the left; consensual reaction was present in both; they both reacted to accommodation. He seemed to have no speech defect on either English or German test phrases. The physical examination was otherwise negative. The Wassermann reaction on the serum was positive; on the spinal fluid, at the first test, it was negative, but the second test was positive. The spinal fluid showed globulin 1, albumin 1, 255 cells, including small and large lymphocytes, endothelial cells, polymorphonuclear and plasma cells, a gold reading 5555543330. A second spinal fluid showed more intense reactions in the protein test, 248 cells, and a gold reading essentially the same as before.

This case presents an acute maniacal outbreak characterized by violence and clouding of consciousness, together with many of the cardinal signs of mania, but coming on more rapidly and clearing up much more rapidly after a shorter duration of attack than is true for a manic-depressive psychosis. There were no cardinal signs of general paresis in any of the phases. The gold reaction, of course, was typically paretic. The high cell count is of equivocal value, but it is usually considered to point more in the direction of a cerebrospinal syphilis of the meningeal type than in the direction of general paresis. It is difficult, therefore, to say whether we were dealing with a spontaneous remission of remarkable type in a case of general paresis, with an acute delirium associated chiefly with a meningeal type of neurosyphilis, or, indeed, with an association of an atypical sort of mania with neurosyphilis. In any case, it is probable that the causative factor was the neurosyphilis, and that treatment had to be directed toward clearing this up. The prognosis in the meningeal types is much more favorable than in the paretic type.

CASE 9 (File No. 12862). — Acute maniacal attack with hallucinations and delusions in a man, aged forty-three. No clinical evidence of neurosyphilis. Serology positive. Rapid recovery.

History. — A Portuguese was brought to the hospital by the police on July 2, 1919, with the statement that he had been normal until the day before, when he became talkative, flighty and incoherent. He appealed to God, got down on his knees and crossed himself.

When seen in the ward, he was oriented, talkative, active; consciousness was entirely clear. He dwelt on a back injury, the fact that he was dirty, that God was going to aid him. God neither spoke to him nor put thoughts in his head. No ideas of grandeur were elicited, although he was euphoric. He denied that there was any trouble with his mind. He was easily managed and co-operated willingly.

Mental examination revealed no memory defect. The family history, as he gave it and as it was given by his brother, was negative. His personal history agreed with the history given by his brother. He had always been quite conscientious and obstinate. About two years before admission he injured his back. Following that he was greatly worried by the pain in his back, his inability to work, and the difficulties he had in endeavoring to secure compensation.

There had never been any mental symptoms until on the night of June 30, when he entered his cousin's bedroom about 11 o'clock, saying, "I want you to go to church with me to-morrow at 10 o'clock to prove I am a true man of God." He was put to bed, but an hour later he partially dressed and ran into the street, crying, "Mother! Father!" then dropped to his knees, and began to pray and talked incoherently. He was

brought into the house and to his room. He immediately upset all of the furniture and began to mop the floor and wash the windows. During the rest of the night he was constantly in motion, repeating, "Man has deceived me. I believe only in God." He continued this way all next day, constantly active and restless. He could be persuaded to lie down, but would immediately jump up. On the morning of July 2 he locked himself in the bathroom and refused to open the door unless his cousin would knock on it three times and call his name three times. About six months prior to this he had complained to his cousin that he had lost all sexual power and desire. This was the only prodromal symptom obtained.

Examination. — Physical examination was practically negative. There was no evidence of any disturbance of nerve functions, so that whatever the injury to his back may have been it had not resulted in any definite organic lesion. The reflexes were all normal. The pupils were equal, circular, eccentric in position and reacted promptly to light and distance. Physical examination was otherwise negative, including the sacro-iliac joints. The urine was normal.

Mental examination revealed that he appeared to tire easily, and at times would not make the mental effort necessary to fix the date of an occurrence. At times he would become a trifle confused and speak about "God not wanting to kill anybody." He was completely oriented. He was continually interspersing his answers to questions with irrelevant remarks, such as, "Believe only in one God, that is all." Some of his remarks indicated the possibility of ideas of persecution, as, "I cry all day and all night to go out with the good people. I appreciate, try to mind all people, but some people try to make bad out of you." When asked if any one had been trying to hurt him, he replied, "My feelings cannot be hurt out of any one. If you punch in my jaw two or three times, that's your chance. I don't care."

He gave a good and coherent account of his past life with the exception of such remarks as were interjected. He gave a history of sexual promiscuity until after his accident. He found that erections produced so much pain in his back that intercourse was impossible. He gave a good history of the accident, the compensation and his difficulties following that. There was no insight into his mental state. He admitted auditory hallucinations and some visual hallucinations. At times he was somewhat agitated, but, on the whole, he was rather indifferent. His activity was fairly normal while here, although there was a definite history of a pressure of activity. His mental condition improved markedly, so that by the fifth day he seemed entirely clear. He remembered the things he had done, but he could not account for them and was not certain of all of the details. He said, "It came so strong on my head it pulled me up and down the street, pull me this way, that way, make my head so big I feel like I go crazy." He did not speak of God, or "being a good man to God any more."

Because of his marked improvement he was discharged to the family instead of being committed.

The serologic examination showed Wassermann reaction positive in blood and spinal fluid; globulin 1; albumin 1; gold 1134400000; 166 cells.

We have here to do with an acute maniacal outbreak, showing some hallucinations and possibly delusions of a religious nature, associated with syphilis of the nervous system, with quite rapid improvement under hospital care. Further outbreaks probably of the same nature are to be anticipated. The duration of the neurosyphilis is questionable, but certainly it must antedate by a considerable period this outbreak.

CASE 10 (File Nos. 7724, 8514, 8563). — Tabetic fireman, aged thirty-eight, with three attacks of grandiose mania, in which the parietic picture is typical. Intensive treatment; remissions with almost complete recovery, good insight and practical judgment, slight memory loss.

History. — This patient was first admitted to the hospital Nov. 23, 1916, aged thirty-eight. He came voluntarily from a general hospital, following a suggestion that he take treatment in our syphilitic clinic. At this admission the patient was perfectly oriented. He said that his memory was not so good as it had been, although he gave a good, coherent account of his life and occupation. He gave a history of syphilitic infection in 1910, with treatment of mercurial inunctions for a period of two years. Other than that his past history had been essentially negative, except for some nervousness, irregular hours, and a good deal of exposure to the weather while attending fires. For about four years, namely, since 1912, he had had some difficulty in keeping his balance, and had had shooting pains in his legs. At this time he showed a little speech defect and sometimes repeated words. His school knowledge was well retained, and his calculating ability was good. His writing showed no tremor. Conduct was normal, and he co-operated well.

Examination. — Neurologic examination showed that the pupils were stiff; knee jerks and achilles jerks were absent; Romberg's sign was positive; the gait was markedly ataxic, and tests of the lower extremities showed poor co-ordination. The Wassermann reaction on the serum and on the spinal fluid was positive. The spinal fluid showed globulin 4, albumin 4, cells 41, gold 5555443100.

Course and Treatment. — He was discharged to the out-patient department and was under treatment there, and during this period worked, attending several large fires. About April 24 he became overactive, planning big schemes involving fire protection for a large number of adjacent towns. He was restless, sleepless, talkative, quite euphoric. On admission he was perfectly oriented, repeated test phrases well, showed absent knee jerks and positive Romberg's sign. At this time a history of syphilis in 1889 was obtained, together with symptoms of tabes as long as

ten years prior to admission, that is, in 1907. These symptoms of tabes were given by the physician who had been treating him. He continued to be restless, very talkative, and had a large scheme for extending the service. There were pressure of speech and activity, some speech defect, but memory fairly well retained. Shortly thereafter the patient became very ill. He was restless, very talkative, confused, with generalized, marked tremor. He gave the month as the 4th of July, the day of the month as Friday the 16th, when it was neither. He said that he had had syphilis in 1819. He was now thirty-eight, born in 1917. The year was 1911. Asked how long he had been here he said "thirty-six years of age." His speech was extremely disordered, and it was difficult to understand many of his words. He was put on the danger list, and it was felt that the end was rapidly approaching. However, he was given an intraventricular treatment and began to improve. He improved slowly, became quite rational and had insight into the attack through which he had passed. He realized that he had been out of his head. July 12, 1917, he was allowed to go on visit, returning June 17, 1918. He was euphoric, emotionally unstable, cried easily, with a vague feeling that he had been mistreated; he was quite excited, restless and circumstantial with a marked pressure of speech. He was rather grandiose, more or less disturbed, and continued so for about six weeks. He then began to quiet down and showed signs of deterioration, which have persisted to the present time, although there has been no further attack of excitement.

This case shows, under the influence of treatment, very remarkable remissions, resembling the remission of manic-depressive psychosis, in which all symptoms except a slight deterioration disappear, and extremely good insight is attained.

CASE 11 (File No. 12861). — Boy, aged twenty-one. He had three attacks of maniacal type: serologic findings of probable early neurosyphilis.

History. — This patient was sent to the hospital July 2, 1919, having been arrested in a neighboring city the night before when asleep on a bench. It was discovered that he had formerly been at this hospital and at Taunton State Hospital, so he was returned to this hospital.

On admission he showed increased psychomotor activity, talkativeness, suspiciousness, and was somewhat resistive. In the ward he was accessible and co-operative, talkative, hyperactive, happy; quite circumstantial in his answers to questions. He was correctly oriented, and had a very good memory.

Examination. — Mental examination revealed some characteristics of mania, with the addition that he was quite critical, somewhat suspicious and slightly evasive. He was distractible, overactive, and showed a small range of ideas; he was elated and somewhat grandiose. No history of syphilis was obtained.

The physical examination was negative. The Wassermann reaction on serum was negative. The spinal fluid showed 14 cells, and a gold reading 1233100000.

Here is a patient with a history of two previous attacks of manic-depressive psychosis, and at present slight alternations in the spinal fluid which are difficult to explain. It would be very important to know whether the positive fluid findings antedated his earlier attacks. In the absence of any positive information it becomes important to follow the case to determine whether eventually the attacks change in type.

Group 3. Hypophrenic Cases.

CASE 12 (File No. 12802). — A feeble-minded woman, aged thirty, without clinical signs of neurosyphilis; positive serology — congenital?

History. — The patient, a hunch-back dwarf, was arrested for vagrancy and for sleeping on the Boston Common, which she says is "good for any one." When asked why she was brought here, she said, "For drinking, I suppose." Why do you drink? "Why, because I like it, and when I like a thing I like it, and I am not going to change, no matter how many doctors is about. I have got a room and I don't bother nobody." She said a man was going to marry her; she had no other friend. She had one sister in the Boston State Hospital. Her father was said to be in the Long Island Hospital. Her sister was committed to the Boston State Hospital in October, 1918, with the diagnosis of dementia præcox, so that practically nothing could be learned about the patient's past, except what she gave herself.

Examination. — The patient was accessible, talkative, rather sullen at times, poorly oriented without marked impairment of memory, but unable to give details accurately, with no school knowledge, saying she was in the fourth reader when she left school. She had a very meager range of ideas; her fund of knowledge was extremely limited. The patient was markedly restless at times, quite circumstantial and talkative when once started.

There was a dorsal kyphosis with pigeon breast. The pupils reacted poorly to light, well to distance. Neurologic findings otherwise were negative. Wassermann reaction on the serum and spinal fluid positive; globulin 0; albumin 1; cells 20; gold 0012332100.

The mental level was 6.8. The patient was co-operative.

From the patient's account of her own life, her poor retention of school knowledge, her limited fund of general information, and her general temperament, it seems quite clear that the mental age represents the highest the patient has attained. In addition, there is neurosyphilis, the origin of which is distinctly ob-

scure. She gave no history of syphilis, and, in fact, denied sex intercourse. With the kyphosis, and the possibility of its being tuberculous, one would have to consider a low grade form of tuberculosis of the nervous system. The positive Wassermann reactions, however, would seem to rule that out, and it seems more likely that the kyphosis was due to a disordered bone metabolism in childhood, or to syphilis, rather than that the spinal fluid changes were due to tuberculosis.

In any event, this is a case of feeble-mindedness with syphilis of the nervous system, demonstrated at the age of thirty, which has possibly been existent since birth; in other words, possibly congenital syphilis without any of the customary signs of that disease.

CASE 13 (File No. 13394). — A feeble-minded boy, aged nineteen, with a mental age of seven and one-half. No clinical signs of congenital syphilis or of neurosyphilis, but moderately positive spinal fluid.

History. — The patient was arrested on the charge of sodomy, which had existed for several months with a younger boy then out on visit from a school for the feeble-minded. He was a typically feeble-minded youngster, whose fund of general knowledge and reactions agreed closely with his mental age.

The family history was negative. There was no history indicating syphilitic infection of the parents. The patient had had diphtheria at the age of three, and was very sick at that time. He had never had a head trauma. He had always been very quiet, and did not associate much with other boys. He was backward in school, reaching the fifth grade at the age of fifteen.

The patient considered himself normal, and was not much concerned over his present situation.

Examination. — The physical examination was entirely negative for signs of congenital syphilis, and for neurologic and mental signs of paresis. The blood Wassermann was negative. The spinal fluid showed albumin 1, globulin 1, 3 cells, and a gold reading of 0012110000.

These signs are equivocal for neurosyphilis, but do indicate an organic disease, which from experience we know is most likely to be a neurosyphilitic one. As previously pointed out, a negative Wassermann reaction in the blood serum is not sufficient evidence on which to exclude neurosyphilis, in case there are other positive tests in the spinal fluid, and this is particularly true in cases which may have a congenital origin. No other hypothesis will so satisfactorily account for the clinical and serologic picture.

Group 4. Cases without Psychotic Symptoms or Clinical Evidence of Neurosyphilis.

CASE 14 (File No. 10524). — No nervous or mental symptoms of neurosyphilis. Constitutionally inferior girl, aged twenty. Serology positive. Treatment. Doing well in community.

History. — This is an extremely interesting case of non-symptomatic neurosyphilis. The patient was admitted to the hospital April 11, 1918. Her father was reported to be a fighter, intemperate and abusive, and took no responsibilities for supporting his family. He died of tuberculosis in 1905. The mother worked out by the day, and was honest, hard working and moral. She was supposed to drink a little. The patient had four brothers, all wild. Two had court records for larceny. One was in the Lyman School, another was a conductor and supported the mother.

The patient left school when in the sixth grade, at the age of fourteen. She then worked in a candy factory, from which she was discharged for being disorderly. Later she was sent to the House of the Good Shepherd. She then worked irregularly, receiving no definite discipline in the home. The medical history was not especially remarkable. At the age of fourteen she began to dress like a woman, painted and powdered, and often stayed out until midnight; on several occasions she stayed away from home overnight. She was immoral with many different men, but denied receiving money. Later, under training and supervision to which she responded well, she began to work out, and did her work well under guidance. She would lie to defend herself. She showed no immoral tendencies, and returned to her home to live. While there she tried several positions, but left all without giving notice. She would stay out until morning hours, and was frequently away all night. She was obviously, judging from letters and other evidence, leading the life of a prostitute, and was sent here for observation.

Examination. — While here she was quiet, accessible, co-operative and talked freely. There were no hallucinations and delusions. She seemed to have a very poor moral conception, and manifested no particular concern over her immoralities.

The physical examination was negative. There was slight tremor of the extended hands, and the knee jerks were active, but the pupils were normal; speech was normal, and there were no signs to indicate any organic involvement of the nervous system. Her mental age was thirteen. However, the examination of the spinal fluid on April 13 showed globulin 1, albumin 1, cells 76, gold test 5443322100. Because of some doubt whether this could be true in the absence of any symptoms, the puncture was repeated on April 18. The results were: globulin 1, albumin 1, cells 132, gold 4443333221.

Course and Treatment. — The patient was then discharged to the out-patient department where she was under treatment, it having been found in the meantime that the Wassermann reaction on the blood serum and

spinal fluid was positive. In August she returned for a lumbar puncture, this time showing globulin 12, albumin 12, cells 1, gold 4433221100.

In the meantime the patient had been working quite steadily, and continues so to this day. Whereas she had not been considerably disturbed about her immoralities, she was considerably disturbed when informed that she had syphilis, and that the outcome might be bad, and has co-operated well under the treatment.

This, then, represents a type of case in which, in the absence of any mental or nervous symptoms, we find marked changes in the spinal fluid, indicating an active invasion of the cerebrospinal axis. This case is quite similar to one of those presented in my previous paper.

CASE 15 (File No. 13295). — A boy, aged fifteen, with conduct disorder. Not psychotic, nor feeble-minded. Character change at eleven. Spinal fluid findings equivocal, but probably indicate neurosyphilis, possibly of congenital origin.

History. — This boy was sent in with the statement that he acted surly, struck his mother, refused to go to school, and was placed at work and refused to work. He acted stupid at times. The father thought his mind might be affected.

The family history obtained from the father was negative. The mother was described as a normal person. The father, himself, seemed normal. He was a traveling salesman; possibly had had syphilis. There was no miscarriage. The older sister was in a school for the feeble-minded; the younger sister was said to be bright, active and sociable.

The boy was always considered bright. He graduated from the eighth grade at fifteen, having spent two years in the sixth grade, when he began to have difficulty. He lost interest in school, did not concentrate, and spent much time reading. He had always been somewhat surly, not responding well to correction or discipline. He was active, and played with boys of his own age. He never had had a fight.

The character change seemed to date back to about the age of eleven. Of late he had been running away. He had seemed to be frightened when his father corrected him.

Examination. — The physical examination revealed nothing remarkable, except certain minor signs of malformation in the head. He was not sociable in the ward, and showed some slight mannerisms and squinting. He admitted his seclusive makeup, masturbation and smoking. He did not work well because the boys were too rough. He admitted having a bad temper, and was somewhat jealous of his sister. He seemed emotionally indifferent, not very attentive, quiet and kept by himself. His intellectual level was 12.4. He had no hallucinations, no delusions, no somnambulism, but had nocturnal enuresis until the past year. He seemed somewhat nervous, but showed no conduct disorder while in the hospital.

The Wassermann reaction on the blood serum and on the spinal fluid was negative. Other spinal fluid findings were: globulin 1, albumin 1, gold test 0023210000, twelve small lymphocytes per cubic millimeter. There was no history of trauma. There were no abnormal lung findings pointing to tuberculosis, and no evidence of any type of tuberculous involvement in the way of temperature, signs of meningitis, alterations in reflexes, etc., so that it appears most likely that the spinal fluid findings are due to a low-grade syphilitic infection of the nervous system, probably congenital in origin. Incidentally, it is not particularly rare in cases of congenital syphilis, in which the nervous system is chiefly involved, to find a negative Wassermann reaction and negative physical signs, with some alteration in the spinal fluid, which cannot be accounted for on the score of trauma, brain tumor or tuberculous meningitis.

CASE 16 (File No. 9282). — Man, aged forty, without clinical evidence of neurosyphilis. No serologic evidence except Wassermann reaction positive in spinal fluid. Despite mild treatment, marked increase in serologic findings in two years, with no clinical symptoms.

History. — This patient entered the hospital voluntarily for a lumbar puncture because his wife had developed paresis. At the time of this first examination the blood Wassermann reaction was negative in four different tests, but the spinal fluid gave a positive reaction in 1 c.c. dilution. The other tests on the spinal fluid could not be done as the fluid was bloody. He had, however, 9 cells. Because of this weakly positive Wassermann in the spinal fluid, and his wife's death from general paresis, the patient was kept in view and under mild treatment for a considerable period. The results of these tests are appended.

At no time has the patient shown any definite mental or nervous signs of invasion of his nervous system by the spirochete. His mental state has been one of some anxiety and apprehensiveness regarding the future, as he was very much impressed by his wife's death. He has continued to handle his business efficiently, and, aside from insomnia and periods when he is more actively apprehensive, during three years he has continued to show no further signs.

Throughout the fall of 1917, 1918 and 1919, until the present, this patient's blood Wassermann reaction has continued to be persistently negative, although repeatedly tested. In January, 1918, the Wassermann reaction on the spinal fluid was again positive. No other tests were recorded. In November, 1918, lumbar puncture showed globulin 1, albumin 2, cells 25, a gold reading 5554443211 and a positive Wassermann

reaction. As previously stated, however, the patient has not up to the present time displayed any mental or physical symptoms which we regard as characteristic of paresis, although the spinal fluid findings have become stronger.

Treatment. — In this case I should also like to point out the failure of what might be called moderate treatment to prevent further inroads on the nervous system. During November, 1917, the patient had three injections of .3 gm. of arsphenamine; during December, two. In 1918, for the entire year, there were twenty-two injections of diarsenol of .3 gm. each, and one injection of mercury. The latter made the patient very sick, so has not been attempted again. During 1919 the patient was given six intravenous injections, a total of thirty-four injections in a year and a half, and, as previously shown, the spinal fluid tests now give more evidence than ever before of the invasion.

This case is important from several points of view. In the first place, it shows that a negative Wassermann reaction in the blood serum is not sufficient evidence of non-invasion of the nervous system by the spirochete. In the second place, it shows the long duration of time during which mild change may be present in the spinal fluid before any definite mental or neurologic symptoms are encountered. In the third place, it demonstrates the failure of ordinary methods of treatment in combating a progressive disorder, such as syphilis of the nervous system.

CASE 17 (File No. 5970). — Boy, aged twenty-two, unstable type, liar, wanderer, inventor, economically inefficient. Regarded as not psychotic, but serologic findings of a paretic process. Diagnosis uncertain.

History. — This patient was admitted to the hospital Oct. 16, 1917, from the base hospital at one of the military camps. The statement received from the military camp indicated that he had had no previous attack, and that the present attack had begun about October 10. He had had a previous head injury, not serious, and the legal papers gave the following statement: "He used to run away from school at eleven years, take a rifle and study nature in the woods, deer and muskrat. Fell from a henhouse, when six years old, on head. Typhoid at two. Shot by boy companion when hunting rabbits. Malaria in 1913. Gonorrhea four times." "I have talked with 100 men and 10 officers and have accurate account of what each man thinks, and have compared this with the same number of men in England, and have worked out the per cent. I can furnish the U. S. A. with meat at 4 cents a pound." "I can put my hands on millions; no one knows it, but I can." "I have proved I can introduce foodstuff." "I have invented a kerosene carburetor."

At the time of admission the patient stated that he had a great invention which would start an engine on kerosene. He had been working on it for two years, and was afraid people would steal it. He said he could supply the army with meat without beef. They thought he was crazy because he walked up and down, but he could easily prove to anybody that his inventions are of great value.

A detailed history was obtained from the family, which indicated that the patient came of a long-lived family, in which no psychopathic determinants were found. He was one of eleven children, all of whom were apparently normal, except for the statement that many of the paternal relatives had a roving disposition.

The boy had less than a grammar school education, learning without difficulty. He was always very active and vivacious. Since about the age of twelve he had been disobedient and difficult to control. Sometimes he played truant from school. He never had much sense of responsibility, and was not very dependable. He was very popular with the boys, witty, quick tempered, not resentful and seldom depressed. He overestimated himself and his abilities, and assumed that every one shares his opinions. He had a general reputation of being untruthful; he told "tall" stories of his own wonderful experiences and achievements, such as the number of deer he had shot. He was very fond of hunting. He had a good deal of mechanical skill, but had not worked steadily. He was of a roving disposition. He left school because he had trouble with the teacher. He did some work in a garage, driving automobiles and repairing. The father tried to discipline the boy for the first time at seventeen, and he left home. For a year and a half he worked as a chauffeur in West Virginia; then returned home, and for two and a half years worked irregularly, usually in automobile shops. In 1916 he went to New York City, where he worked for an automobile concern. Later he called himself "Huppy" Smith, and claimed to be a great race driver. He returned four or five months later. He told his family that he had made one or two trips across the water, taking care of horses on a boat. They did receive some cards from him mailed at London and Liverpool. He worked for a time in an automobile shop, but was habitually late; then for a time with his father, and then as overseer of men in the repair of roads. His family regarded him as something of a mechanical genius, and had petted and praised him a great deal on that account.

At the age of seventeen he had what was supposed to be a Neisser infection, which was treated for two or three months and is said to have been cured. He was hypochondriacal and made a big fuss at a little pain.

He was drafted into the army, and two days later began to write to his people that he was not fit for army service. A week after he went to camp the family visited him. They found that he had lain five days on his cot with his coat folded and placed under his head for a pillow. They were told that he had been inoculated for typhoid fever, and directly after had fallen against a radiator and cut his head. By October 13 he was much

disturbed because he had had no opportunity for bathing, was nervous and homesick. After his usual manner, he told exaggerated stories.

The informant, a brother, gave no history of hallucinations or of what appeared to him to be delusions. He thought that the patient's ideas in regard to his invention were not irrational, that he had been working on it for two years. There was no history given of convulsions, syncope or other physical symptoms.

Examination.—The physical examination showed that he was well developed and well nourished. The face was asymmetrical, the nasal septum deviated to the right; there was a mucopurulent discharge from the nose. Some teeth were missing; others carious. Heart and lungs were normal. The blood pressure was: systolic, 120; diastolic, 80. The pupils were equal and regular, and reacted to light and distance. Knee jerks were active and equal. There were no abnormal reflexes. The ophthalmoscopic examination was negative. Roentgenogram of the head gave no evidence of trauma. The urine was negative.

On mental examination it appeared that the patient was quite satisfied with himself and discussed his hopes quite freely. He was anxious for assistance to present his plans to the authorities. He seemed somewhat overactive, although not markedly so. He was extremely talkative with a remarkable flow of speech. He was correctly oriented, and did not consider himself ill but in a dilemma. He appeared to believe that because of his deliberate intention to make himself nervous and ill he was sent here. He asserted that he wanted to appear queer so that he might get his plans before high authorities. He also stated that he had said all the queer things he could think of when brought before the doctor. His memory was quite good, but in his account of his past experiences he showed an egotistic attitude. He stated that at fifteen he started to see the country because he felt that he had had little education. He would work a few days, then travel to another place. He named a great group of towns in West Virginia in which he claimed to have lived. He said he had been in New York, New Jersey, Kentucky, Tennessee, Ohio and Arizona, and that he had traveled over nearly every state in the West. He said that he had falsified his age when sixteen, in order to vote. He gave a long and circumstantial account of his wanderings over the United States and crossing to England, and a very detailed account of all the things he did while working in the garage at home. He asserted that following a fire in a large private game preserve he had noticed the next year that the deer were feeding on the tender shoots in the burned district, and yet the bushes and trees and grass grew and became more luxuriant than on similar land outside the preserve. So the idea came to him that deer feeding on vegetation did not destroy it, but apparently did it good, and therefore a given number of deer per acre would be self-sustaining, having always a constant source of food supply. On this problem he had been working ever since. He says he has been a mighty hunter, having killed many deer, both in and out of season. He finally calculated that

the acreage required for the deer was the same as for the cow in pasture, — one-half acre per head. He gave elaborate details on the subject of the care of a herd, breeding, etc. He worked out two schemes, quite absurd, for feeding the army meat without using beef.

The patient also gave a long, detailed mechanical description of a carburetor which would use kerosene instead of gasoline.

On the basis of the history that the boy had always been queer, a good deal of a liar, a rover, and that ideas of the type presented above had been frequent, together with the family's feeling that he was a mechanical genius, we regarded him as not psychotic. He was overactive and quite talkative, and emotionally elated and egotistic. But as all of these things were described as being a part of his usual makeup, and as his intelligence was quite up to that of the average adult, we conceived that he was a case of psychopathic personality. The Wassermann reaction on the serum, however, proved to be positive, whereupon a lumbar puncture was done, which showed globulin 1, albumin 1, cells 63, and Wassermann reaction strongly positive. Another neurologic examination proved to be negative. Further inquiry did not reveal a memory defect or any of the characteristic or essential symptoms of general paresis. Accordingly, the classification of the case is extremely difficult, although it is obvious that we have to do with a case of neurosyphilis, whether congenital or acquired is not certain, in a boy who otherwise shows very little except psychopathy. Of course, the ideas which he presents are absurd, but not more absurd than the beliefs of many people who are regarded as normal. It seems clear from the facts obtained that if neurosyphilis did not exist from the first, we deal with a case in which developing neurosyphilis has not so far altered the clinical symptomatology.

CASE 18 (File No. 12051). — Pseudoparesis in a man, aged thirty-three. No syphilitic history. All serology negative.

History. — This case is presented from an entirely different point of view. The man was first seen in consultation at a general hospital, where his memory defect, euphoria, general dulness, tremor, speech defect, loss of calculation ability, pupils and incontinence led to a diagnosis of general paresis, but the blood and spinal fluid findings were negative. Because of this the patient was transferred from the general hospital to our institution on Jan. 28, 1919. For the past few months the patient had become forgetful, and it had become difficult for him to think and focus his attention. He was very drowsy a great deal of the time, and had headaches and pains in his legs. On admission it was difficult to hold his attention,

and very little information could be obtained because of his poor memory. He showed a speech defect. He gave a history of influenza in November, with good recovery.

Examination. — On physical examination nothing abnormal was found on the sensory side. His speech was defective. Test phrases were repeated poorly. The gait was wide based and shuffling. Station was not defective. He had coarse tremor of the hands. The superficial reflexes were all present; the deep reflexes were present and active. There were no abnormal reflexes. The pupils were slightly irregular, but reacted to light and distance. The patient was incontinent.

Mental examination revealed approximately what has been given before, — namely, that he was somewhat euphoric, and attempted to co-operate. His memory was very poor, especially for recent events. Retention of school knowledge was poor. He could not give a good history of his own past life. He gave a past history of malaria in 1906 and in 1910. He had been alcoholic when in the army, but could give no additional facts. There were no delusions and no hallucinations. Associational range was narrow. He had complained of severe frontal headache, slight blurring in vision, projectile vomiting, but no attacks. All the time he had been under observation, either at the general hospital or here, his blood was negative to the Wassermann test, and his spinal fluid negative to all tests. We considered the case as probably one of frontal lobe tumor for reasons that need not be given here.

My sole purpose in reporting this case is to raise anew the question of pseudoparesis, which is to my mind of doubtful value as a conception. The case also brings forward the point that neurologic signs, non-focal in character, of generalized cerebral invasion, may be produced by other things than the spirochete, and that, accordingly, clinical evidence alone is not enough to establish the presence or absence of spirochetes in the brain. This case has wide and important bearings on the question of the post-influenzal psychoses, and will later be considered in that connection.

CASE 19 (File No. 12244). — A man, aged thirty-six, with a hemiplegic stroke at thirty-four; neurologic signs of organic disease; serology negative. Treatment; two months later serology positive.

History. — The patient was admitted to the hospital on voluntary application, March 6, 1919. He complained of inability to concentrate, following a stroke in October, 1917, and seemed to be mildly depressed. The mother seemed to have been somewhat peculiar, having attacks of hysterics, so called, at the time of the menopause.

The patient was a high school graduate. Later he was successful in the wool business, going into a larger concern on a partnership basis in October, 1917. He was ousted from the firm, and there had since been a

great deal of difficulty about arranging financial matters in connection with his interest. His wife regarded him as an affectionate, sensitive man, nervous, because it was difficult for him to keep still. He did not worry, did not care for dances or the theater, was bright, well informed and fond of outdoor sports. He had some impediment in his speech. He was not a drinking man until the time of his business difficulty, when he began drinking; the exact amount was unknown.

Oct. 23, 1917, he had had a stroke. He had previously complained of feeling tired and found it an effort to do his work. At the time of the stroke his face was drawn to the left; his speech was thick; he said there seemed to be a film over his left eye. His right arm and leg were paralyzed. He fell, losing control of his limbs, but regained the use of his leg the following day. He remained in bed two weeks, and at the end of that time was able to walk. He was unable to cut meat for himself until December, and until that time it was difficult for him to keep food in his mouth. From December to April he was in a sanatorium; he spent his time in outdoor sports. When he returned to Boston he felt well enough to go back to business, but was unable to start anything because of the situation then existing in the wool market. He made an attempt to do other kinds of work, but this depressed him, and he felt unable to do so. In July he became very much depressed and somewhat later disappeared. He wrote letters that he was going to the Maine woods, then that he was going to Chicago. Ten days later he was in Boston. He said that he had been in a hospital in Chicago, but could not remember its name or why he had gone there. He then seemed somewhat better, but did not return to work. He had a slight attack of influenza in September, apparently without bad results. In January, 1919, he again became depressed. He refused to mingle with people. Once he said, "You know what I am going to do if my head doesn't get better. I have often thought of killing myself." But he made no attempt at suicide. He complained that some of his thinking power had been taken away. He seemed to lack attention and concentration.

Examination. — Physical examination revealed that he was well developed and well nourished. There was impaired vision in the left eye. There was no disturbance of ocular movements; no abnormal reflexes. Gait and station were normal. There was slight tremor of the tongue. All superficial and deep reflexes were present. Knee jerks were unequal, hyperactive. Pupils were dilated and reacted to light through a narrow range. The blood pressure was: systolic, 120; diastolic, 85. The spinal fluid was entirely negative. The Wassermann reaction on serum and spinal fluid was negative. The left eye-ground showed a peculiar arrangement of vessels in the disk, and probably some slight choking. The right eye-ground was negative.

The patient was easily disconcerted if questions were asked too rapidly, but his memory was good and he gave a coherent and detailed account of his past life. He seemed somewhat depressed. He was slow to answer and used stereotyped expressions.

A very careful and thorough neurologic examination failed to reveal anything indicating a focal lesion. A total of seven blood Wassermann tests were negative, both before and after provocative arsphenamine injection. A roentgenray examination was practically negative.

The patient was pleasant and co-operative, and gradually became somewhat less depressed. He then went voluntarily to the Grafton State Hospital, where in May, 1919, another lumbar puncture was done, showing a positive Wassermann reaction, albumin normal, globulin 0, cells 57, gold test reading 2442330000. The Wassermann reaction on the serum was negative.

Accordingly, we have here a case with a definite history of a hemiplegic stroke occurring eighteen months before the patient was seen, with considerable recovery of function, but with some difficulty in concentration, attention and rapidity of thinking and acting. No history of syphilis was obtained. He had been somewhat alcoholic immediately prior to the stroke, and was, at the time of our examination, not psychotic, although showing some neurologic findings. The negative serology would seem to exclude neurosyphilis, but under the influence of treatment the spinal fluid showed markedly positive findings in the way of Wassermann reaction, cell count and gold reaction, although the Wassermann test on the serum and the protein content remained negative. Hence, in the presence of neurologic signs, a negative serology is not enough to exclude neurosyphilis. Accordingly, the importance of equivocal signs is emphasized.

SUMMARY.

1. Nineteen cases are presented, of which fourteen are undoubted cases of neurosyphilis, one a case of pseudoparesis and four have negative physical and equivocal serologic findings.

2. Of the fourteen undoubted cases, only four present clinical evidence from which a diagnosis of neurosyphilis could be made.

3. Neurosyphilis occurs more frequently in association with paranoid psychoses than is usually recognized. Although six cases are here reported, not one is a clear example of the syphilitic paranoid psychosis, two being heavily alcoholic, one a paretic, and two possibly not neurosyphilitic, though showing changes in the spinal fluid.

4. Any type of abnormal mental state, or no abnormal state, may occur with neurosyphilis. It does not follow that all such cases are paretic.

5. Serologic findings may definitely increase under treatment,

with or without increase of clinical signs, emphasizing the importance of provocative treatment in rare cases.

6. A negative blood Wassermann reaction, or many such, are not always conclusive negation of the presence of neurosyphilis.

7. A negative spinal fluid is not absolutely conclusive evidence of the absence of neurosyphilis.

8. Since neurosyphilis may exist in association with any type of mental symptoms, and since such states may exist in the absence of any of the usual signs and symptoms of neurosyphilis, it follows that lumbar puncture should be done at least in all cases which present any atypical features. It is equally important to puncture cases with any clinical signs of neurosyphilis, since the signs may be misleading.

9. The prognosis and treatment of any cases are always modified by the presence of neurosyphilis.

10. Neurosyphilis as a disease may exist for a long period before symptoms appear.

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THE TECHNIQUE OF LUMBAR PUNCTURE.*

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This slight operation, which, with proper technique, is almost painless, may become the source of considerable torture to the patient if not properly carried out. The technique is, however, simple, yet in the hands of many seems extremely complex. The main points are coolness, exact anatomical knowledge, careful direction and the co-operation of the patient. Good co-operation is often difficult to secure, largely because of the fear of the patient, or, in psychotic people, because of the psychosis.

Certain points in the technique have struck me with particular force, and I wish to emphasize these in connection with a brief description of lumbar puncture.

Position. — Puncture may be done in either the upright or lateral decubitus position. Having used both, I much prefer the lateral position. The patient lies on the right side with knees and chin as nearly as possible in opposition with the chest. This makes a nicely rounded back in which the anatomical landmarks may most easily be recognized. Patients are told in simple language that if they hold the position the pain will be like that of a pin prick; that they are going to be pricked; that the anticipation is worse than the realization. In other words, the operation is explained and the patient reassured. An attendant holds the patient in the position, exerting as little actual force as may be necessary.

Asepsis. — It is unnecessary to emphasize the importance of absolute asepsis on the part of the operator. He should prepare himself with the same care that he would for any other operation. The needles should be thoroughly sterilized by boiling, and the tubes into which the spinal fluid is drawn should be sterile (in order that the tests shall not be interfered with by bacterial contamination).

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We have found a very simple preparation of the patient to be entirely satisfactory. The selected portion of the back is painted with tincture of iodine, and no more elaborate asepsis is apparently necessary. Many thousands of punctures have been done here without ever recording any instance of infection as a result.

Needles. — We find that the most satisfactory type of needle is one devised by Leshinsky of New York. This is made of a nickel alloy. It is flexible and will bend to almost any angle without breaking. It is made in much the style of the original Quincke needle, with a stylet that is always ground in position when the needle is sharpened. The ordinary Luer syringes can be fitted to the needle for medication or when aspiration may be necessary.

One of the important points in satisfactory technique is that the needle shall be sharp. With a good sharp needle there is much less probability of excessive pain to the patient.

Landmarks. — The *site* of election for lumbar puncture is between the third and fourth lumbar vertebræ. This space is usually the widest. With the back in the right position, however, lumbar puncture may, with entire safety, be performed in the second and fourth spaces and rarely in the first space. In children one needs to remember that the spinal cord extends to a lower point in the vertebral canal than it does in the adult. In the adult the lower end of the cord is usually about at the first lumbar intervertebral disc. Accordingly, punctures below this point may be done without danger of injuring the cord. The third lumbar space is, as a rule, about on the level with the crest of the ilium. This constitutes a useful guide in fat people, when palpation of the spinous processes may be uncertain.

One must be careful to find the middle line, and one must be careful to allow for spinal curvature, if such exists. The *point* of election for puncture varies. I prefer to go in the middle line, going through the thinnest portion of the supraspinous ligaments, and so straight in, whereas others prefer to take a point about 5 millimeters to the right of the middle line, thereby avoiding the supraspinous ligaments altogether. However, I find that I am able to direct the needle more accurately if I take the middle line than if I go to one side. At times, however, as where there are many exostoses of the spinous processes, it may be necessary to go to one side in order to avoid the bone.

Direction. — With the index and middle fingers of the left hand the operator locates the point at which he wishes to do

puncture. With the elbow raised these two fingers are applied to the middle line from the left side of the patient. Having found with the middle finger the spinous process below which we wish to insert the needle, and having ascertained the general characteristics of the space with the index finger, the index finger is then pulled downward on to the spinous process of the next vertebra, thus rendering the skin tight and leaving a space between the two fingers corresponding to the intervertebral space into which the needle is thrust.

Most of the difficulties in puncture, which are not to be explained by lack of co-operation, are due to the failure of the operator properly to direct his puncture. Having located the space with the thumb, he takes the thumb away and jabs at the space with the needle, or perhaps he marks it in some way and then jabs. The difficulty here is that the relations are not precisely kept in mind at all times, as they may very easily be if the fingers are kept in position in the manner described above.

In quiet, co-operative patients, in whom the landmarks are at all palpable, the above method will obviate the necessity for punching and poking around and causing the patient great pain by bringing the needle in contact with the periosteum. If one is careful to keep the mid line, to direct the needle at right angles to the longitudinal axis of the column, to select carefully his space and then go through it with equal care, results are very good indeed. Rarely, however, bone will be encountered in an unexpected place. In such cases, by withdrawing the needle slightly and altering its direction, always in the axis of the column, we are usually able to get into the canal without further difficulty.

Having found the proper place, the needle should be quickly passed through the skin and then further progress may be more slowly made. If the needle is slowly pushed through the skin, the pain is considerably increased and the tendency to arch the back forward is also increased. This is one great advantage of a sharp needle.

The pain of lumbar puncture comes: (1) when the skin is pierced; (2) if the periosteum is touched; (3) referred pains occur when bundles of nerve are struck. In the normal case no referred pains will be complained of, since the nerves, being movable, slide out of the way of the needle. But in cases with meningitis, when the nerves are matted together and so do not evade the needle, pains may be referred to the leg; and rarely we may get involuntary kicking, due to irritation of motor roots.

One can usually tell when the needle is entering the spinal canal. There is a slight increase in resistance to the passage of the needle when the dura is reached, and this suddenly gives way to non-resistance, often with a slight sound which is perceptible. This very characteristic feeling of loss of resistance indicates the proper time to stop inserting the needle.

Care must be taken that the needle goes in straight and not to one side. Occasionally this occurs, and the point of the needle is inserted into the dural space at its lateral margin. In such cases very little fluid will be obtained. By partially withdrawing the needle and redirecting it straight, fluid may be gotten.

Care must be taken not to overrun and go into the bone or intervertebral disc at the front of the canal. This is painful and often gives slight hemorrhage into the fluid.

In many cases the fluid does not run very rapidly, and we have found that by twisting the needle, without varying its depth of introduction, the fluid will nearly always run out at a sufficiently rapid rate. Just why this should be so is not entirely clear.

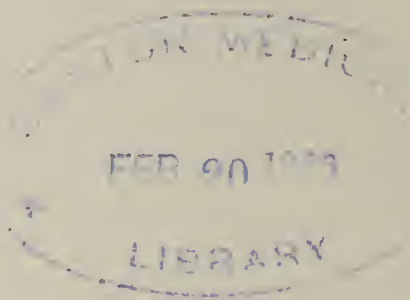
One should not withdraw more than 10 c.c. of fluid, except in cases which are to be treated. It is safer to withdraw smaller than larger amounts, because of possible after-effects. When a sufficient quantity of fluid is obtained the needle should be quickly withdrawn.

The iodine is then washed off the back with alcohol, flexible collodium applied to the point or points of puncture, and the patient is put to bed for twenty-four hours. During this time he should lie flat on his back, without a pillow, and it is somewhat advantageous if the foot of the bed be raised. He should have only a liquid diet during this time.

After-symptoms of puncture do not, as a rule, occur in those with a meningitis. It is very rare indeed for a parietic or other case of neurosyphilis to suffer any discomfort after lumbar puncture. Cases with normal meninges, however, often have headache and sometimes nausea and vomiting, particularly if they have not kept quietly in bed or if an excessive amount of fluid has been withdrawn. In case headache and nausea are complained of, we find that potassium bromide, in 20-grain doses, given once, or twice if necessary, will often suffice to correct the headache and nausea. At times a mild grade of headache may persist for several days. Very rarely the discomfort is so acute that it is necessary to give a hypodermic.

SUMMARY.

With some co-operation on the part of the patient and a good technique, lumbar puncture is a simple and practically painless operation. With good technique it may be successful even in the absence of co-operation. The major points in technique are: accuracy of position, accuracy of direction, quickness, knowledge of where to go and when to stop. The after-care of patients is simple, but they may require sedative medication, if any unpleasant results, chiefly headache and nausea, occur.



STATISTICAL CLASSIFICATIONS AS APPLIED TO THE WORK OF TEMPORARY-CARE INSTITUTIONS.*

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SCHOOL.

Outlines of classifications of mental diseases intended primarily for statistical purposes usually have very little scientific or practical medical value, largely because of their rigidity, and, to a lesser extent, the requirements to fit them for the purpose for which they are intended. It seems to me, however, that it should be possible to have a logically arranged, inclusive, elastic scheme, embodying definite principles in the determination of the manner of inclusion of the various groups, including in a definite fashion all of the known facts, while allowing for expansion with the accretion of knowledge. The classification adopted by the American Medico-Psychological Association seems to me open to certain very serious criticisms in the lack of any logical grouping of many disease states, — in other words, lack of any very definite principle in determining the groups, — and in its very great rigidity. Its cumbersome nomenclature and its inapplicability to cases of certain types, as well as failure to provide for any variation or additions, distinctly limits its scientific value, however valuable it may be for statistical purposes.

Any scheme of classification intended for the use of temporary-care institutions, such as the Psychopathic Department of the Boston State Hospital, must be so prepared that it brings sharply to the fore the practical aspects of the institution's purposes, caring for scientific aims as adequately as possible, and being as elastic as we can make it.

The point of paramount importance in the temporary-care institution is the further treatment of the patient, a point determined by the type of disease (if any) present and the social

* Psychopathic Department Contribution, Series of 1919, from Proceedings of the American Medico-Psychological Association, seventy-fifth annual meeting, Philadelphia, Pa., June 18-20, 1919.

situation. Limited in size as such an institution is, with a high admission rate (here in Boston, 1,900 to 2,000 cases per annum in a hospital with 110 beds), and the necessarily short period of time during which the majority of patients may be observed (about 80 per cent of our admissions are discharged within a period of ten days), this question of the movement of population is undoubtedly the most important of the practical issues raised. The fact that there are a certain number of beds for, and a second particular purpose in, the treatment of acute and curable cases merely emphasizes the importance of the problem. Another distinctly important point lies in the variability of the material received in such a hospital, ranging all the way from normal people involved in difficulties of various kinds, through all varieties of physical disease without nervous complications, to all types of nervous and mental diseases. It seems accordingly that, whereas the usual patient received in State hospitals is insane, as certified by two physicians and approved by a judge, in the work of this hospital there is absolutely no way in which to predict to what group or groups the individual may belong. Finally, there are certain methods of treatment applicable to the cases according to the conditions found in the patient. Bearing all of these points in mind, our first division into large groups is an easy matter. It will be found that all cases seen fall into one of ten large groups:—

- I. Psychoses.
- II. Mental deficiency.
- III. Epilepsy.
- IV. Psychoneuroses.
- V. Psychopathy.
- VI. Nervous diseases.
- VII. Physical and other diseases.
- VIII. Drug and alcohol addiction.
- IX. No disease or defect (normal).
- X. Undiagnosed.

There is a definite purpose in the ordering of the groups. They are placed in the order of treatment possibilities, frequency in numbers, and degree of deviation from the normal. The grouping represents an attempt to place the cases in such an order that the principle of diagnosis by orderly exclusion is applicable. Certain of the groups are differentiated not so much because the writer believes there is any essential reason for it,

as in deference to popular classifications, or because of a usual difference in treatment. Thus in any scientific scheme I should include the psychoneuroses with the psychoses, and the psychopathias and feeble-minded in one large group of defectives (without reference to the part the intellect plays, as is done in the terms used).

Each of these large groups now demands further subdivision, which is done along certain lines, allowing always the interpolation of any other system of naming disease processes.

I. *Psychoses*. — Under this there should be eleven subgroups, including, so far as I can see, all of the types now recognized.

A. *Neurosyphilis*. — Include only cases with psychosis under this heading. Cases of neurosyphilis without psychosis belong in group VI. Feeble-minded with neurosyphilis, in group II, etc. Paretic, vascular, meningeal, diffuse, gummatous, paranoid, etc., syphilo-psychoses.

B. *Psychoses with Defective Basis*. (Either feeble-mindedness or psychopathic personality, where the psychosis cannot further be determined as to type.)

C. *Psychoses with Epilepsy*. (Epileptopsychoses.)

D. *Exogenous Poisons* (pharmacopsychoses). — Including the various types of psychoses due to alcohol, drugs or poisons of any type. In each the etiological agent as well as the clinical type of psychosis should be specified.

E. *Somatopsychoses*. — The *etiology* and type of psychosis should be included (delirium, manic state, schizophrenic state, etc.).
Etiology:

Infectious.

Metabolic.

Glandular.

Exhaustive.

Toxic (as a general group in which the precise cause cannot be determined).

F. *Encephalopsychoses*:

Traumatic.

Infectious.

Vascular.

Neoplastic.

Malformative.

Degenerative.

Specifying in each case the type, if known.

G. *Geriopsychoses*. — Including the various types of presenile psychosis (involution melancholia, presenile delusional, Alzheimer's) and the various types of senile psychoses.

- H. Dementia Præcox.* — In this group it is questionable whether the temporary-care institution should be required to specify the type, as it is often extremely difficult. If regarded as desirable, the following types should be recognized: simple, hebephrenic, catatonic, depressive-delusional, maniacal, paranoid and "other" or "mixed" types.
- I. Cyclothymoses.* — Of the maniacal, depressed and mixed types.
- J. Paranoia and Paranoic Psychoses.* (Recognizing by this latter phrase that we really do not know anything about these psychoses aside from the fact that they occur.)
- K. Psychogenic Psychoses.* — For the so-called "hysterical insanities," etc.
- L. Undiagnosed Psychoses.* — To apply only to cases which are certainly psychotic, but cannot further be grouped.

II. Hypophrenia. — There are two ways to classify the feeble-minded, and both methods should be used for every case. We have the division according to standard nomenclature into idiots, imbeciles, morons and subnormal. It is even more important to regard the case from the etiological standpoint. Here we have the following groups: —

1. Syphilitic.
2. Encephalopathic: —
 - (a) Traumatic.
 - (b) Infectious.
 - (c) Neoplastic.
 - (d) Malformation.
3. Glandular.
4. Hereditary.
5. Undetermined.

III. Epilepsy. — Here again the important point is the etiology, since the group of epileptics having psychoses are already separated out, as their treatment differs from the cases in this group. We can distinguish: the syphilitic, organic (traumatic, infectious, neoplastic, vascular, degenerative), toxic (?) (either exogenous or endogenous), glandular and idiopathic.

IV. Psychoneuroses. — As these cases are usually best treated in private practice or in sanatoria, it is thought wise to maintain them in a separate group, despite the fact that there is very little scientific basis for such division. We should recognize neurasthenia, psychasthenia, hysteria, anxiety, hypochondriacal, traumatic, tics and "other" types.

V. *Psychopathic Personalities*. — This term is preferred to the monstrosity “constitutional psychopathic inferiority” (involving as it does a redundancy and a conception of inferiority which is not necessarily, though often, present). Probably the following types, intended to be only suggestive, will include the major ones: epileptic, hysteric, cyclothymic, unstable, autistic (seclusive, phantastic, eccentric, indifferent), paranoid, psychasthenic (neurotic), inadequate, liars and swindlers, sexual.

VI. *Nervous Diseases*. — Intended for those cases sent in for diagnosis in which no psychosis, mental defect, etc., are found, but having a definite nervous disease. Here would be included the cases of tabes, or of laboratory neurosyphilis without clinical signs, meningitis, brain tumors, etc.

VII. *Physical and Other Diseases*. — For the cases sometimes sent in (usually under misapprehension) who have no mental problems, but a physical disease of one sort or other demanding treatment, or, possibly, in connection with a physical disease have a very slight mental disturbance (as anxiety or depression) which does not justify inclusion with the psychotic, but treatment should be directed to the physical disease. The deliria should be included in group I, E.

VIII. *Drug and Alcohol Addiction*. — For the occasional case brought in while under the influence of the drug or alcohol, showing no symptoms when recovered from the immediate effects. Cases which show the psychopathic makeup to begin with should be classed under the appropriate heading, with the addition of the term “drug” or “alcoholic.” Cases with deterioration should be classed under the psychoses.

IX. *Normal*. — In these cases, where we are unable to determine the presence of disease or defect, the cause for admission should be specified. In the great majority of cases this will be found to be some type of conduct disorder, or legal difficulties, or for guidance in determining social adjustment.

X. *Undiagnosed*. — Reserved for the cases in which we are not able, either by shortness of stay or because the evidence is conflicting, to determine in which of the other nine groups the patient belongs.

With such a scheme we make the greatest possible allowance for the scientific advancement in the study of disease, while at the same time we have an eminently practical division of our cases along lines which do not involve the time-honored problem of sane or insane. It lies within the province of the temporary-

care institution to recommend proper further treatment of its cases, and accordingly we must classify our cases according to the recommendations made.

There are ten possible recommendations belonging in two broad groups. First, we have the custodial cases, in which we recommend commitment as —

Insane (hospital).

Feeble-minded (training school or hospital).

Epileptic (hospital).

Criminal (reformatory, etc.).

Chronic invalid (chronic hospital or almshouse).

Then there is the non-custodial group, in which we may recommend treatment in a sanatorium or as a voluntary patient in a State hospital; treatment in an out-patient department; treatment in a general hospital; guidance in the community; or ordinary life in the community.

At different times we may recommend different methods for the same patient, according to the patient's condition. Our recommendations are not necessarily followed, so we need to record, in every case, the actual disposition of the patient. Tables should be prepared showing for each of our ten major groups what the actual disposal is.

Statistics on our admission, prepared according to the American Medico-Psychological Association classification, are available for the past year. I am told their value is limited in some ways because of the large group of not insane. It seems to me that statistics prepared according to the scheme here outlined would present the greatest value and ease of interpreting which can be secured. It seems to represent a logical method of analysis of the cases we actually see.

THE MENTAL HYGIENE OF INDUSTRY: A MOVEMENT THAT PARTICULARLY CONCERNS EMPLOYMENT MANAGERS.*

BY E. E. SOUTHARD, M.D.

Note. — In February, 1919, the Engineering Foundation undertook to support a limited study by Dr. Southard of mentally abnormal persons in industry. This paper is an introductory statement to the records of this study, which is still in progress and is producing results of practical value. The term mental hygiene is used to cover the expert activities of medical men who deal with the problems of mental diseases, of those who are endeavoring to improve the methods of mental testing, and of those persons in industry who are dealing with personal matters and have had experience in character handicap cases.

Dr. E. E. Southard was pathologist to the Massachusetts Commission on Mental Diseases from 1909 and Director of the Boston Psychopathic Hospital from 1912.

“Mental hygiene of industry” is proposed as the term for a rapidly growing group of ideas suggested by such phrases as: *the human element, personal factors, individualization, character analysis, scientific selection, social significance, moral values, workman’s standpoint, workman’s ambition, creative impulse, instinct of workmanship, rôle of habit, fatigue and efficiency, anti-social behavior, wasteful emotions, unemployment and personality, the psychopathic employee, civilian shell-shock analogues, neurasthenia, a disease in engineers.* All these expressions and many like them have been found in recent engineering literature, to which an increasing number of articles is being contributed both by practical managers who have grown up in the work, and by specialists from many fields. The term has become familiar on account of the excellent results obtained in various fields in war and peace by the National Committee for Mental Hygiene, founded in 1909, and has the special advantage of not assigning the human element to any one particular science or art such as psychology, psychiatry† or social work. The psychologist, whether inside or outside of a laboratory, can and often does

* Reprinted from *Industrial Management*, February, 1920.

† *Psychiatry*, the name ordinarily given to the practical branch of medicine that deals with the diagnosis and treatment of mental diseases. The ending, *iatriy*, refers to the matter of treatment or “healing.” See also notes on terms in the Appendix to this paper. *Psychosis* refers literally to any condition of mind, or mental state, but is ordinarily used by practitioners of medicine to mean a form of mental disease. Thus a victim of dementia præcox (see footnote on p. 65) or of general paresis (see footnote on p. 66) or of any other mental disease is said to be suffering from a psychosis.

correctly claim that he is a mental hygienist. The psychiatrist, neurologist or other specialist in nervous and mental diseases* can also properly term himself, and often does, a mental hygienist, and the newly developed art of social work, particularly in its psychiatric division, is developing new workers who are effective aides. Also the practical and intelligent employment managers of the present day, whether trained by experience alone or in the special courses recently established (and, of course, greatly stimulated by the war emergencies), are workers who also deserve the name "mental hygienists."

Time was when the mental hygiene of industry was regarded as hopelessly vague — nay, Utopian. Of course, the field of industrial hygiene itself has come under cultivation only recently. The world has become accustomed to the idea of public health, and it was only natural that the great conceptions of public health should begin to be applied to industry. Factories and mines began to lay their health problems at the door of public health specialists and other medical men. Meantime eager laboratory workers were more and more minded to carry their results from the test tube, the microscope and the smoked drum back to the factories and mines. Yet there was always over and under and penetrating all through these problems of factory and laboratory this so-called human element, baffling but inviting, vague but insistent. Probably the war served to precipitate out of vagueness the mental hygiene of industry. In the war the psychologists got interesting results with their individual and group tests. At the same time the specialists in nervous and mental diseases were showing concrete results in obtaining an army relatively free from liability to what (for the want of a better name) has been called shell-shock. Not the least achievement in the mental hygiene of the war was the development of a small but effective group of social workers as skilled as laymen can become skilled in the approach to mild mental and nervous diseases and their practical handling under medical direction outside institutions. When we use the term "mental hygiene of industry" we intend, therefore, very definitely to suggest that something practical in the shape of a new art has been found, looking toward betterment in industry.

One good way of finding out whether a science or an art is really something definite, and not merely an empty logical fiction, is to note whether the supposed science or art has itself developed a personnel. Let me briefly sum up the situation as follows:—

* See notes on terms in the Appendix to this paper.

(a) There is a *psychology of industry* because there are certain applied psychologists, or "mental testers." This applied psychology uses mental tests and scales (after the manner of Binet and others). These tests and scales have been developed for individuals in groups, and are susceptible of vast specialization as industrial problems get definitely in mind. The mental tests seem to be especially useful in hiring. Perhaps they will become useful in the always difficult problems of promotion. Perhaps even some of the problems of job analysis for individual workmen will be solved by applied psychology.

(b) There is a *psychiatry of industry* because there are certain psychiatrists and neurologists who have actually been at work on the problems of industry. Its immediate value is likely to be in the problems of discharge and in grievance problems, particularly if by the term "grievance" we could be understood to mean also all sorts of minor dissatisfactions in plant management. Industrial psychiatry is likely to be of especial value, it would seem, on some sides of the analysis of "turnover." Practical experience in getting jobs for the mentally handicapped unemployed seems to indicate that industrial psychiatry will be of special value in job selecting for certain psychopathic or cranky or "different" employees, whom it may be extremely desirable to retain in service. Experience in this field will eventually throw much light on the problems of hiring and promoting.

(c) There is a *field of psychiatric social work in industry* because there are psychiatric social workers now prepared to enter the field of industry (a few individual workers have already entered the field, but too few from whom to draw general conclusions). Psychiatric social work is a new art, in part auxiliary to medicine, in part, of independent scope. These workers track down the discharge, grievance, dissatisfaction and psychopathy problems outside the factory or mine. They might help to track down these same problems inside the plant, on demand of employment managers or minor executives. The point of view combines "efficiency" and "welfare," and brings to the surface many stabilizing and destabilizing factors inside and outside the plant, — factors that the managers have rarely seen till too late or perhaps in too general terms.

PROGRESS AND LIMITATIONS.

Concerning (a), the new *industrial psychology*, there is no doubt of its permanence. Early claims were too sweeping; but, though the professors were overenthusiastic, the industrialists were equally injudicious in their expectation of ready-made results and rubber-stamp devices for manipulating the human mind. A little perspective or ordinary business sense should have stopped such vagaries.

But the personnel work of the psychologists in the American army, and the elimination, by neuropsychiatrists supported by psychologists, of the feeble-minded from the army have settled for all time the question of the applicability of skilfully and specially devised mental tests to groups of men as well as to individual men. We do not need to grant one-half of the claims made for this work to concede that this kind of mental-measurement psychology has come to stay. Even if we limited consideration to the personnel work of the Secretary of War's office alone, or to the work of the nervous and mental division of the Surgeon-General's office alone, we should be able to demonstrate the value of these methods. Of course, it will be a long time before the full story of these efforts and results can be properly told by the experts engaged. But no one who aided in the unheroic but strenuous "Battle of Washington," and saw on the ground the progress made possible by the above two agencies, can fail to see that a long step was there taken in military psychology. Here was a large scale production with a vengeance. It takes but half an eye to see that many of the methods and some of the conclusions of military psychology can be carried over with due modifications into industry. And in point of fact some of the army psychologists are now entering the industrial field.

Concerning (b), *industrial psychiatry*, the situation is undeveloped but hopeful. There are important lessons from the war here also. The Surgeon-General's office had a busy and effective new division — new to any army, it is believed — called the division of neurology, psychiatry and psychology. This combination of interests already constituted a long step in the direction of a true mental hygiene. To be sure, the sociological side of the problem was not adequately represented in the new division of the Surgeon-General's office as it was constituted in the war. But that was, no doubt, due to the lack

of practical sociologists interested in the relation of man to man, soldier to soldier. However, many of the psychiatrists and psychologists were sufficiently men of the world or socially minded that a due admixture of the sociological point of view was almost attained. In the end, too, the establishment of the so-called "morale officers" shows very well the trend of the whole plan toward a consistent military mental hygiene, representing psychiatric, psychological and sociological viewpoints.

If there was a military psychiatry entirely aside from the problems of the front, *i.e.*, a military psychiatry due to the existence or development of more or less mild and incapacitating nervous and mental diseases in American camps already on this side of the Atlantic, it is plain that an industrial psychiatry must exist of similarly large dimensions. Perhaps of larger dimensions! Women are engaged in industry. Older men and women are found in industry than the men of military ages. Industrial risks exist, perhaps not so acute as the war risks, but of a very varied nature.

Before the war the psychiatrist was almost unheard-of in industry. Here and there some plant physician or accident specialist might be found who had had a partial training in nervous and mental diseases. But, if his judgment was sharpened by that training, the fact was forgotten, and his success was no doubt laid to his "personality." Nowadays a few more men can be found associated with advanced plants. Yet in one plant system, where over 25 physicians held posts for one purpose or another, it transpired that no single one had ever had training in nervous and mental disease.

Nor can such men be easily obtained. He would be rash who should claim that there are 2,000 trained male or female American neuropsychiatrists. Probably there are far less than 1,000 able and willing to work in connection with industry. The majority of these are at work in other absorbing tasks. For some time it will be advisable for large plants to have part-time consultants, chosen from among the more able mature neuropsychiatrists. Care must be exercised in the selection, for some of the professionally best of these men remain too analytic for the industrial situation, and unable to see the values of rough and ready practical combinations which are the lot of employment managers and the minor executives. These consultants, if they once see the problem, can choose full-time younger medical aides, if such prove actually necessary.

As for (c), *psychiatric social work in industry*, we are entitled to expect large results therefrom. We have grounds of expectation not only from war work but also from the results obtained by psychiatric social workers long *ante bellum*.

PSYCHIATRY APPLIED TO INDUSTRY.

Just as nobody would now think of denying the routine value of physicians and surgeons in industrial plants, so nobody can fail to note the good done by ordinary social workers in connection with industry. There is simply no dispute on either of these matters. To be sure, some managers may stress the *welfare* values of the doctor and the social worker, while other managers think of them as contributing to plant *efficiency*. But these are questions of the temperament of the managers, not of the nature of the results in the plants.

Now it requires no great refinement of viewpoint to see that, instead of a general practitioner of medicine, for some plant purposes (*e.g.*, discharge, grievance and certain turnover problems) a physician with psychiatric training would serve far better. The psychiatrist is by training and experience a *specialist in grievances*; why is it not logical to apply this specialism to the grievances of industrial plants? On precisely the same grounds the social worker with *psychiatric experience* is preferable to the general social worker for the purposes of industry, if we can prove that a considerable number of the more difficult plant problems are psychiatric or have a psychiatric tinge.

For the present argument may I take for granted that the values of psychiatric social workers *outside of industry*, both in war work and in peace work, are generally admitted? To be sure, there may not be over 200 trained and experienced psychiatric social workers in the country at the present writing; accordingly it is only where they do exist or have been at work that their values are even understood, much less questioned. But there is, so far as I am aware, no dissentient word anywhere about the results of these workers, where they are in evidence at all.

But we have stronger evidence. For about five years the Psychopathic Hospital in Boston has carried on specific work in relation to the psychopathic employee. Some studies of the results of this work have already been published.* The facts

* I do not here refer to work on occupation neuroses and upon the nervous and mental sides of industrial accidents, which topics have also been the subject of special communications, but rather to the topic of the psychopathic employee in a more general sense.

of these psychopathic employees in and out of industry have been minutely followed by the psychiatric social workers of the hospital, some of whom have specialized in the problems of employment. Probably more minute work has been done upon this problem from the hospital side than by any other agency. For a large part of the five years in question a special committee has been interested in the matter. As an outgrowth of this work the Engineering Foundation of New York, the joint research organization of the American societies of Civil, Mining, Mechanical and Electrical engineers, has under way preliminary investigations on the topic. We already know in specific instances what the psychopathic employee has cost the plant, the family and the State. We have cases under care which might have figured in dozens and scores of "turnover" analyses in different firms, had such analyses been made. In one instance five typewritten pages were occupied by the bare entries of employment and discharge by different firms. Of course, our work was primarily undertaken in the interest of the individual patient, and secondarily in the interest of saving the public service additional expenditure for unemployed psychopaths. We did not at first have in mind the efficiency or welfare of industrial plants; but it has now become perfectly plain that the interest of the community, broadly considered, is identical with the interest of industry more narrowly considered, and that both these interests are identical with the psychopath's own interest.

This is not the place to expound details of cases. In the spring of 1919 we were able to demonstrate from the everyday material of the Psychopathic Hospital clinic a number of things of great interest to employment managers sent to us for practical exercises. We showed man after man whom the employment managers acknowledged themselves capable of hiring on the spot for a variety of jobs. Yet the stories which the patients themselves readily and willingly unfolded upon very slight questioning were immediately indicative to the employment managers that the hiring of these applicants would have been a dangerous or delicate business, or a business requiring careful and special adjustments. We were able to show cases in which the special features brought out by the physicians or the social workers proved of decisive value in solving the patient's own problem of making a living and the industrialist's problems of securing a good workman. It is a well-known and commonplace observation with employment managers, and all who have to do with personnel, that many a psychopath — a cranky, grouchy, queer

or otherwise difficult person may be just the man wanted for a special task. An outline of these psychopathic hospital clinics as given in the spring of 1919 to employment managers is being prepared for publication. The specifications for clinics of like nature for employment managers in the different great centers can readily be laid down, and some of these specifications will be shortly published.

BREADTH OF MENTAL HYGIENE.

The problem of mental hygiene is wider than medicine and wider than the branch of medicine that deals with nervous and mental diseases. The problem touches mental and social sciences and arts of the greatest breadth. Yet the indispensable core of the problem may well turn out to be medical. I had the privilege, in the spring of 1917, of many remarkable hours of consultation with the late Carleton Parker. He had, as everybody knows, come to a view of the great importance of the underlying ideas of mental disease and defect in the problem of industrial unrest. Every psychiatrist who appeared on the Pacific coast was eagerly interviewed by Parker for what said psychiatrist might have to say on problems like those of temperament, monotony, fatigue and the like. It is a great wonder that an economist could have come independently to this point of view. Perhaps if more economists with thoroughly scientific training should live with the workmen as Carleton Parker did with the hoboës, the problem of hiring and firing, of promotion, of job selection, and, in fact, the entire problem of personnel, would get settled faster. Another economist, Prof. Irving Fisher, has gone so far as to use the phrase "industrial psychiatry" in published work.

DR. ADLER'S CONCLUSIONS.

There is a brief but interesting literature from the side of medical men themselves. The work on unemployment and personality at the Psychopathic Hospital, as above mentioned, led to early publication by Herman M. Adler, M.D., now criminologist to the State of Illinois, but at the time of this work chief of staff at the Psychopathic Hospital. On the basis of concrete case material, Adler rendered conclusions as follows:—

1. There are individuals in the community who, for a variety of reasons, are not able to regulate their conduct on the basis of experience. One of the difficulties that such individuals get into is unemployment. The re-

sults of their unemployment bring hardships on themselves and on their dependents.

2. While some of these individuals show defects of such a severe nature that they may be regarded as hopeless, and therefore can be segregated, there are others in whom the deviation from the normal is not sufficient to make them incapable of supporting themselves at all times, and it is unwise to segregate them and prohibitively expensive.

3. From our analysis it appears that there are two types of individual that experience these difficulties. One type, which is grouped under the headings of "inadequate" and "paranoid,"* is afflicted with certain characteristics of personality which are not amenable to treatment. To maintain these people in the community it is necessary to modify the environment so far as possible in order to prevent, in the first place, the calling out of their peculiar reactions, and furthermore, to prevent their suffering the results of their acts; in other words, to keep a man "on the job" in spite of his personal unpopularity or inadequacy. The other type, grouped under the heading of "emotionally unstable," suffers from the results of temperament. These individuals are subject to variations of temperament, and the treatment of their unemployment must be guided by a knowledge of their tendencies, so that environment on the one hand can be suitably influenced or chosen for them, and that the individuals themselves may be trained to counteract their impulses to some extent.

MISS JARRETT'S STUDIES OF EMPLOYEES.

Miss Mary C. Jarrett, now working on this topic under the Engineering Foundation, published briefly certain studies of the psychopathic employee as a result of her Psychopathic Hospital work. In general she found "employers quite willing to employ patients whose mental condition and industrial efficiency are frankly described, and to retain them as long as they are able to do the work. Understood by their employers and taught to understand themselves, psychopathic individuals who would otherwise be thrown out of industry may keep their places as efficient employees." She concluded by stating "that an important division of social psychiatry would be the application of psychiatric knowledge to industrial problems." She charted six cases in particular (one of dementia præcox,† one of depres-

* Paranoid, afflicted with delusions (or false beliefs) of persecution, *e.g.*, by fellow workmen, minor executives, relatives, in a variety of ways, *e.g.*, damaging or hiding tools, non-promotion or raising of pay, nagging, poisoning.

† Dementia præcox, a non-fatal mental disease which in severe forms makes up the bulk of asylum populations, but which in milder forms is found in large numbers outside asylums. Dementia præcox has several types, *e.g.*, a type of simple deterioration (as if the patient had acquired a degree of weakmindedness), a paranoid type, and a type, so-called catatonic, in which bizarre postures are maintained.

sion of an alcoholic, one of neurasthenia,* one of pronounced alcoholic psychosis, one of peculiar form of alcoholic jealousy and one of general paresis),† which occurred, respectively, in a machinist, a tailor, a clothes presser, a packer, a teamster and another machinist, — all of which cases, through the efforts of physicians and psychiatric social workers, became industrially adjusted. Alcoholism in some of this group of cases may, of course, be regarded as one of the symptoms of a psychopathic constitution, exaggerating the original defect. It will be interesting to note whether national prohibition will abolish these problems. It is highly probable that many problems will not become abolished, but will be merely simplified.

In a later paper Miss Jarrett has discussed what she has termed shell-shock analogues under civilian conditions. She says, concerning the war neuroses themselves: —

The considerations that strike the psychiatric social worker in this situation are, first, the desire that this new, widespread knowledge of the neuroses that war is making prominent may be turned to the advantage and relief of civilians who suffer from similar troubles and receive inadequate consideration; second, that experience in the social care of civil cases of similar nature may be used to advantage in restoring soldiers suffering from shell-shock to normal social condition; third, that a thorough, intelligent public understanding of these disorders should be established against the day when the soldier who suffered shell-shock shall have again become a civilian, and the cause of his trouble may not be remembered acutely enough to arouse sympathy for symptoms that still persist.

She found that the analogues of shell-shock in civil life appeared frequently at the Psychopathic Hospital. The range of exciting causes was from trivial incidents, such as a quarrel or reprimand, to a profound shock, such as an accident in which the patient is severely injured and a companion killed. She found another feature of the situation, which the layman cannot readily understand, namely, that the severity of the symptoms is not at all proportionate to the size or apparent importance of the cause. Treatment, however, must be relative to the gravity of the disease and not to the nature of the particular strain or shock which induced the condition. She narrates cases in detail

* Neurasthenia, a "nervous" rather than a "mental" disease (in the common acceptance of these terms), because victims almost never reach asylums. Sometimes known as the "American disease" or "nervous prostration." Instability, easy fatigability, "run-down" feelings, and complaints about supposed diseases of organs, such as stomach, spinal cord, sex organs, are found.

† General paresis, commonly termed "softening of the brain." All true cases of general paresis have been shown by modern work to be due to syphilis affecting the nervous system.

to show, first, certain failures in social treatment which came about through lack of medical resources and inability to compel treatment; secondly, cases of pronounced success obtained by comparatively slight service, such as advice to the family or finding the patient a suitable position; and thirdly, cases in which results were obtained only with the most intensive social care.

These cases included a failure to cure a perfectly curable neurosis* in an Italian laborer simply because medical facilities are not available in his home town and he cannot be brought to a central clinic; cases of character change following accident; cases of amnesia, and the like. Some of these cases might seem to run far afield from industry, but Miss Jarrett was able to find important connections between these cases and a variety of employment situations, with the net result in many instances of complete adjustment. Something like half the cases of social work in mental hygiene clinics, such as that of the Psychopathic Hospital in Boston, will be found to throw light on various aspects of the employment problem.

IDENTIFICATION OF PSYCHOPATHS.

Readers of engineering journals are familiar with turnover analyses in which sizeable lists of the causes of discharge and unemployment are to be found. Jau Don Ball gives certain methods of examination which he has used, in his own phrase, "as scientific aids to industrial efficiency." It would be equally true to say that Ball's methods and those of others engaged in this work are also practical aids to industrial welfare. Efficiency experts and welfare workers can unite in this mental hygiene program. Ball gives the following list of persons that might especially come under examination: *queer guys, eccentrics, disturbers, querulous persons, unreliable and unstable fellows, misfits, the irritable, the sullen, socially disgruntled, unsociable, negative, conscientious, litigious, bear-a-grudge, peculiar, glad-hand, gossipy, roving, restless, malicious, lying, swindling, sex pervert, false accuser, abnormal suggestibility and mental twist types.*

One might contrast this list of persons, who are either psychopaths or near-psychopaths, or would obviously benefit by

* Neurosis, a term usually now restricted to the so-called functional neurosis, that is, a disease of the nervous system which is essentially and theoretically always curable. Modern writers almost always see a psychic element in these neuroses which include, for example, neurasthenia (see preceding footnote), psychasthenia (among which may be found conditions like the so-called "doubting folly" and obsessions), and hysteria (neuroses with various curable palsies, losses of sensation, etc.).

the kind of analysis which the psychiatrist would bring, with the following list of causes for removal from pay roll quoted by Mr. Thomas T. Read, from a well-known department store blank form: —

- | | |
|-----------------|---|
| Other positions | <ol style="list-style-type: none"> 1. Better salary. 2. Former position. 3. Going into business. 4. More promising position. 5. Position nearer home. 6. To learn trade. Leaving city. To marry. |
| Health | <ol style="list-style-type: none"> On account of health. 1. Own accord. 2. Division superintendent's account. 3. Doctor's orders. |
| Dissatisfied | <ol style="list-style-type: none"> 1. Did not like supervision. 2. Distance too great. 3. Refused temporary work. 4. Refused to be transferred. 5. Resented criticism. 6. With salary. 7. Did not like working conditions. 8. Work too hard. |
| Unsatisfactory | <ol style="list-style-type: none"> 1. Agitator. 2. Carelessness. 3. Dishonesty. 4. Drinking. 5. Fighting. 6. Financial difficulties. 7. Indifference. 8. Insubordination. 9. Irregular attendance. 10. References. 11. Superintendent's private file. 12. Suspected of pilfering. 13. Too slow. Reduction of force. |
| No reason | <ol style="list-style-type: none"> 1. To go to school. 2. To stay at home. 3. Worked less than two weeks — failed to report. 4. Worked more than two weeks — failed to report. |

Among these orders the whole “dissatisfied” and most of the “unsatisfactory” groups are clearly subject to review from the

point of view of mental hygiene. In particular may be mentioned as important to review from the standpoint of mental hygiene the "not liking of supervision," the "resentment of criticism," "too slow," "agitator" and even "dishonesty." There are 38 causes in the above list, and fully half of them would give the mental hygienist pause. This is not to say that there are not plenty of dishonest people who are, so far as we know, merely delinquent and not psychopathic. There are, doubtless, plenty of instances in which the work assigned is actually too hard. There are also times, no doubt, when insubordination is a virtue and neither a vice nor a sign of mental disease. The point here made is simply that such causes as those above classified suggest review from a mental hygienic point of view.

PSYCHOPATHS AND STRIKES.

Ball described the analysis of certain employees in a firm where two months after Ball's examination a strike occurred. Ball states that "in the case of every employee terminated for the group examined, whether discharged or voluntarily leaving, the prediction of a possible abnormal conduct or a dissatisfaction was made in the laboratory report and recommendations to the employer." And further, "according to the records, every one of the strikers had something wrong with him from a nervous or mental standpoint (nearly all having a psychopathic history); it was noted that with three exceptions the 'strikers' cited as agitators were among those grading the highest on the intelligence scale used." The intelligence scale used was a selection of tests made by Dr. A. W. Stearns during his naval work on the Pacific coast as examiner of recruits. Stearns promises early publication of his work, of which an advance account was given at a meeting of the National Association of Psychiatrists.

Of course no mental hygienist, least of all Drs. Ball and Stearns, would assert that all or many strikes could be prevented by advance studies of workmen. In fact, Ball specifically says that "it could not be concluded from this or any other examination that all strikers, whether agitators or not, are psychopaths; but this examination does show that the agitators in this group were the self-assertive ones and the ones grading the *highest in intelligence*; — the others simply followed the leader. Nobody needs to say that there are not strikes having purely economic causes. Nobody needs to say that there are not strikes and other labor troubles due to mental disease or

character defect either in the employment managers and minor executives or in the plant owners themselves. Some of the very conditions which make for self-assertiveness and success of a sort among labor leaders are conditions which make for the success of financial magnates and captains of industry. Nobody claims 100 per cent efficiency for any of these or kindred proposals.

PRACTICAL METHODS OF APPLICATION.

Ball draws several important conclusions. He thinks that what he calls medico-psychological laboratories (I think this term "medico-psychological" will hardly get across so well as the simpler and more comprehensive term, "mental hygienic") ought to become principal departments of employment bureaus in large industrial organizations. Small plants might pool their interests for the establishment of such clearing houses. Labor organizations might well have, according to Ball's suggestion, representatives in these bureaus. Ball calls attention to the value of this work to the individual, to the industrial plant (emphasizing here the enormous reduction of labor turnover), to labor organizations (stabilization of personnel, clearer understanding of general problems), and to the community. He thinks the community would be aided —

(a) By lessening the number of undesirable floating population.

(b) By increasing the number of persons owning homes.

(c) By lessening the number of strikes.

(d) By decreasing the number of accidents and loss of life.

(This especially applies to public service corporations. Instances are numerous where the lives of the public have been endangered by the *irresponsible acts* of morons,* epileptics and mentally and physically ill individuals in the employ of public service corporations.)

I believe that to make this community program most effective we shall need to add to the laboratory for employment bureaus suggested by Ball also all the facilities and arrangements for medical social work, and in particular for psychiatric social work. In short, we shall be compelled in the end, I believe, to add to the staffs of large industrial organizations mental hygiene clinics manned by competent practical psychologists and by psychiatric social workers. Very large or special plants or systems of plants might well require psychiatrists on full time, but all mental

* Moron, a term which has recently come into use for those feeble-minded whose intelligence is higher than that of the imbecile or the idiot and roughly corresponds to the mental level of those above the age of seven, but subnormal.

hygiene clinics for industrial organizations should have available the services of consultant psychiatrists at least.

In highly developed communities where the public service has developed effective stable mental hygiene clinics (such as the out-patient departments of psychopathic hospitals) large industries could send their special cases to these clinics for examination. Men who for any reason might have to be removed from the pay roll would then fall into the most adequate hands for their further social care. Man after man would get adjusted in other and more suitable employment through the procedures of competent social workers, supported by analyses of temperament and fitness provided by the consulting psychiatrist.

In other situations it might prove a better plan for various firms to combine for the establishment of a common mental hygiene clinic. Mutual aid would be given to the organizations by this plan of combination, and many a workman would soon find himself in a better job than he had ever had. As many contacts with the public service as possible should be made, since in this way some not altogether unreasonable suspicions by labor leaders will tend to be allayed. I have tried to indicate that the point of view of mental hygiene as applied to industry is neither a matter of efficiency alone nor a matter of welfare alone, but combines the two points of view.

DEVELOPMENT OF PUBLIC HEALTH WORK.

The development of public health work did not primarily include mental hygiene. Public health work probably started, as a rule, in the arousal of the community's interest in sewage and simple sanitation problems. Next, the public health specialists turned from these relatively simple engineering problems to bacteriology and the prevention of infectious diseases, at first through water supply and thereafter by a variety of measures. Latterly, however, we are witnessing the public health workers go over to special studies in personal hygiene. Studies of personal hygiene culminate in mental hygiene. The long, separate flow of work in mental hygiene will shortly fuse with that of public health in general.

The public health movement was for decades a movement for public bodily health. It must now become a movement for public health, bodily and mental. For example, the new school of industrial hygiene in Harvard University will pay important attention to the various problems of mental hygiene. "The Journal of Industrial Hygiene," already in its first volume, con-

tains reviews of mental hygienic interest. The United States Public Health Service has also developed alongside of its personnel for bodily health measures the beginnings of a personnel for mental health measures. In the future, no doubt, every practitioner of medicine will get a grounding in mental hygiene. Parallel with this highly desirable state of affairs the rapidly growing group of public health nurses may, at some future time, get training in the principles of mental hygiene so that they may function in this field. Up to the present time, however, the number of physicians and the number of nurses, whether or not these physicians or nurses belong to the public health school, have not had the training or direction of interest such that they would prove very helpful in the mental hygiene of industry as here conceived.

Any clever layman can see some things with half an eye. The point of the movement for the mental hygiene of industry consists not in calling the attention of clever laymen to some obvious facts, but in suggesting to the clever layman that he look into the good work that has been recently accomplished in the various departments of mental hygiene, such as applied psychology, psychiatry and psychiatric social work. "Life," said Herbert Spencer, "is an adjustment of inner to outer relations." Most of the study of economists and political scientists has been spent on the outer relations. A good deal of new work has been done on inner relations, both normal and abnormal, by psychologists and physicians. Out of the philanthropy of the past has grown the humane but also efficient social work of the present day. The social workers must now do their best to aid in the adjustment of all these relations. This is a gigantic task; but is there anything to do but to go to it to approach this task with all the expert light possible?

SUMMARY AND CONCLUSIONS.

1. The general object of this paper is to set forth the existence and present rate of progress of a movement for the *mental hygiene* of industry.

2. This term "mental hygiene" is coming into general use to cover the expert activities of *psychiatrists* (*i.e.*, medical men interested in the problems of mental disease, including the mildest forms of temperamental deviation), *psychologists* (*i.e.*, scientific and theoretical experts, who are now turning attention to methods of mental testing designed to improve and replace the hit-or-

miss methods of the past), and various non-professional or semi-professional *aides* (such as *social workers* with special experience in character-handicap cases).

3. The recent improvements in employment management and all activities dealing with industrial personnel show that industry is ready for the new movement, and employment managers everywhere are displaying the keenest interest in the new ideas.

4. Meanwhile the war-time results of the experts in mental hygiene enumerated in paragraph 2 have given practical demonstration of the value of mental hygiene in a business partaking largely of the nature of industry, namely, the business of war.

5. The earlier literature of industry conclusively shows that the "mental hygiene of industry" is nothing new in its essence (witness, many older references to the *human element*, etc.), but to-day's contribution is the organization of older interests for a systematic attack on industrial personnel problems.

6. The keynote of this systematic attack on industrial personnel problems by means of mental hygienic data and methods is the pooling and co-operative combination of expert engineering interests and expert medical and psychological and sociological interests — in brief, *the invoking by the expert in industrial personnel* of the aid of all available experts in personality, to the study of which the whole personnel problem must reduce.

7. The interested personnel man or lay reader is implored not to take sides for one or other claims or counter-claims by medical men, psychologists and others concerning the virtues of special methods. The topic is growing and a little controversial; but on the whole, the quarrels about method are superficial and the unanimity of experts extraordinary (no doubt the trials of the war served to mature and season the experts on all sides).

8. Another warning! Every time the world has tried to measure things more accurately, many foolish persons have risen to protest. Not a few medical men and psychologists will rise to say over the same formula against the mental hygiene of industry. It is to be hoped that, at this late date of the world's history, we can jump this zone of senseless protest against what must inevitably succeed, — namely, a program of more expert study of anything whatever, including the human personality, wherever at work.

9. The movement for a mental hygiene of industry is neither an outgrowth of the efficiency movement (Taylorism and the like), nor an outgrowth of the workmen's welfare movement

(economic interest in shorter hours, better working conditions and the like), though mental hygiene does effectively combine "efficiency" and "welfare" (as it were, F. W. Taylor and Jane Addams).

10. On the contrary, a stream of independent developments in our knowledge of personality (medical, psychological, illustrated, for example, in the kind of insight into human nature displayed by William James) is now pouring itself into a branch of engineering — personnel management — which has been running parallel for some time. Let us think of the movement in the terms, not of F. W. Taylor nor of Jane Addams, but in terms of William James.

11. The text contains sundry definitions and general statements on these lines. Future papers will amplify the account.

12. Perhaps the argument for a mental hygiene of industry may be put in a nutshell form as a question: Why should not industrial managers seek the aid of (*a*) those who can measure at least a few of our mental capacities and have shown their abilities in the war work; of (*b*) those who are the best specialists we yet have in temperament and the best experts in grievances yet developed; and of (*c*) others less professionally trained who are capable of tracing out or helping to trace out the actual situation of (*e.g.*) labor "turnover" as shown in the individual instance?

13. In short, why not help to push on the movement for individualism in industry that every one sees coming and ardently hopes for?

APPENDIX.

NOTES CONCERNING AUTHORS QUOTED.

Dr. Herman M. Adler, at present Criminologist to the State of Illinois and Director of the Juvenile Psychopathic Institute in Chicago, was formerly Chief of Staff at the Psychopathic Department of the Boston State Hospital, and Assistant Professor of Psychiatry in the Harvard Medical School.

Dr. Jau Don Ball is Professor of Nervous and Mental Diseases in the Medical Department of the University of Southern California, Los Angeles, and has contributed various articles on nervous and mental diseases to medical journals.

Miss Mary C. Jarrett, A.B., was for many years associated with Children's Aid Society of Boston, and was chief of the Social Service at the Psychopathic Department of the Boston State Hospital from 1912 to 1918, inclusive, and is now working under the auspices of the Engineering Foundation.

Dr. A. Warren Stearns is secretary of the Massachusetts Society for Mental Hygiene, with offices in Boston, associated as consultant with the local Red Cross organization, and with the teaching staff of Tufts College Medical School. He has contributed numerous articles upon psychiatric topics, and was for years connected with the Danvers State Hospital and the Psychopathic Department of the Boston State Hospital.

The late Professor Carleton Parker was an economist and sociologist among the first to take up the psychiatric point of view in his topics (for his life and interests see "An American Idyl," by Cornelia Stratton Parker, 1919).

Irving Fisher, professor of political economy at Yale University, is well known for various public interests in economics and sociology, and was largely instrumental in organizing the Life Extension Institute.

NOTES ON CERTAIN TERMS.

In the text of this article the distinction between psychologists and psychiatrists is clearly enough drawn. The psychologist in the past has been something of a theorist, and the so-called "brass instrument" psychology was a matter of college laboratories. At the best the results of these psychologists stood to industry, education and the arts as theoretical physics stands to railroad engineering. Even before the war, however, the terms, "psychology" and "efficiency," fell into the habit of being used together. The world was therefore not at all unprepared for such practical work as that of Lieutenant-Commander Raymond Dodge in certain naval problems; of Colonel W. D. Scott in the classification of army personnel; and of Major Robert M. Yerkes in mental tests of recruits.

All this work by psychologists is distinct from the work of psychiatrists. Psychiatrists are medical practitioners in the field of mental diseases. Psychiatrists used to be termed "alienists," dealing as they were thought to do with alienations of mind. Psychiatrist is a better and broader term which has now come into general use, and is rapidly supplanting the term alienist, which latter term might perhaps be reserved for medical men engaged in the medico-legal problem of responsibility of internment in asylums. It is important to insist that the psychiatrist now ranges over a much broader field than his colleague, the medico-legal alienist, or than any one would have been ready to admit in the last century. His purview includes nowadays the slightest of character defects as well as the most serious of mental diseases.

Writing for employment managers and other laymen not skilled in the various mental sciences and arts, perhaps I should warn the investigator that the popular mind is inclined to talk of all these matters as psychology. Perhaps the term psychology does in some broad sense include all the mental sciences, but it is more than doubtful whether it ought to include or does include the various mental arts and types of technique (the so-called psycho technique of some writers). The practical thing for the

investigating layman to bear in mind is that if he goes to the college professor of psychology he may find somebody rather unsympathetic to mental tests and inclined to underrate their importance. If he consults an applied psychologist he may find an ardent mental tester who is not at all interested in what he thinks are the rough and ready, inexact conclusions concerning temperament, character, instincts and impulses which the less laboratory-minded man is willing to discuss. Now and then the investigating layman may meet an enthusiastic psychologist or physician prepared to explain the majority of difficulties on some special bases (*e.g.*, the fear neuroses or sex). In the endeavor to make up his mind about these things, the peripatetic layman may run into sundry prejudices between psychologists and physicians, or between certain groups of psychologists and physicians, and certain other groups of psychologists and physicians. The layman must take heart. He must extract the honey of mental hygiene from a great variety of flowers, each, no doubt, with what you might call a different honey index. And he must look out for charlatans.

I have occasionally used the term "neurologist" and even the term "neuropsychiatrist." There are certain differences between neurologists and psychiatrists, and there is coming to be a group of men who, under the name of neuropsychiatrists, fulfill effectively both functions. From the standpoint of mental hygiene as applied to industry I have no doubt that men calling themselves neurologists are precisely as good mental hygienists as their brethren called psychiatrists. The neurologist is a medical practitioner dealing primarily with nervous diseases. He is the sort of man naturally called in for a case of occupation neurosis (writer's cramp) and that sort of thing. The psychiatrist, or alienist,* as he was formerly called, is the sort of man who would be called in for a case of sudden outbreak of excitement; but the two fields so overlap that the distinction is likely to fall. As for the difference between certain diseases called nervous and some of the mild so-called mental diseases — well, it would puzzle the archangels to make a distinction. But although the layman need not particularly distinguish between neurology and psychiatry in his search for mental hygienic points, he must beware of thinking that he can get such points from any and every medical practitioner. He cannot.

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TRADE-UNIONISM AND TEMPERAMENT: THE PSYCHIATRIC POINT OF VIEW IN INDUSTRY.*

BY E. E. SOUTHARD, M.D.

NOTE. — This is the second of Dr. Southard's papers on "Mental Hygiene of Industry" resulting from the study supported by the Engineering Foundation. It was read as a professional paper at the annual meeting of the National Committee for Mental Hygiene on February 4 last. In a most interesting way the four types of trade-unionism classified by Hoxie are compared and contrasted with the four classical temperaments. The suggestion is advanced that studies both by psychiatrists and psychologists will contribute much to our understanding of trade-unionism, which may be a manifestation of mass psychology, and thus will assist the engineer, sociologist and statesman in their efforts to solve the problems of industrial unrest.

Dr. E. E. Southard was pathologist to the Massachusetts Commission on Mental Diseases, Director of the Boston Psychopathic Hospital, Director, Massachusetts State Psychiatric Institute.† — THE EDITORS OF THE BULLETIN.

The philosophy of trade-unionism is yet to be written. Its history is acknowledged to be baffling. Its present status deserves no other term than "hectic," and its future seems quite beyond prophecy. There are many trade-unionisms rather than any single trade-unionism; but, whether one or several separate trade-unionisms, most observers would regard the trade-unions as a phase rather than an end, as a technique rather than a purpose, sociologically considered. I was led to the present reflections while trying to clear the way for concrete work on the mental hygiene of industry.

Under the auspices of the Engineering Foundation some workers have recently been trying to discern whether the principles of mental hygiene could not be applied with some reasonable hope of success to the problems of industry. Now the tools of the mental hygiene movement, that is to say, the mental hygiene personnel as so far developed, fall into at least three groups: (a) a group of psychiatrists, (b) a group of psychologists, (c) a group of social workers; and in point of fact a few psychiatrists, a good many psychologists and a number of social workers with more or less mental hygienic training are already at work under various auspices in industry. It is not my task here to speak of the beginnings and progress of that work

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† Dr. Southard died suddenly February 8.

summed up recently in papers by Dr. Stanley Cobb of the Harvard School of Industrial Medicine, entitled "Application of Psychiatry to Industrial Hygiene," and by myself, entitled "The Movement for a Mental Hygiene of Industry." In the present communication I wish to speak in a narrower sense (*i.e.*, excluding psychology in its technical sense) of *industrial psychiatry*, that is, of the psychiatric division of mental hygiene and the possibility of its application to a leading problem of industry, — namely, trade-unionism.

POOLING OF PSYCHIATRY AND ECONOMICS.

"Industrial psychiatry" is itself no new topic. The phrase was perhaps first used by Irving Fisher, professor of political economy in Yale University. But the idea that the psychiatric point of view might profitably be applied to industry has become almost a popular idea with the publication of "An American Idyl," the remarkable biography of the late Professor Carleton Parker of California and later of the State of Washington, by his widow, who has carefully noted the progress of the psychiatric idea through Parker's independent thinking and his personal contacts with American psychiatrists. In short, there has been a much more sudden and productive pooling of psychiatry and economics than either mental hygienists or sociologists could have hoped.

But is such a union of mental hygienic and sociological interests as those foreshadowed by Carleton Parker likely to be early fruitful? After all, are we not dealing with pious hopes rather than with productive conclusions? I am afraid that many practical business men find little to hope for and much to fear in any collection of theoretical ideas that we may tie together with the name "*ology*," or in any movement of the world dignified by the suffix "*ism*." Ologies and isms, the practical business man once might have risen to remark, have no place in American practice — to-day he knows he should know better. The close relation of ology to ism in practice is well enough shown even in Marxian socialism. There seems to be no doubt that Marx got many of his ideas from the German philosopher Hegel, and many others from the French social philosopher Saint Simon, and even some from the English economist Adam Smith and the followers of Adam Smith. The comprehensive history of European thought written by J. T. Merz speaks of Marxism as a kind of materialistic paraphrase of the philosophy of Hegel and

regards the materialistic results of Marx as working directly into the hands of the German historical school of political economy and jurisprudence. Herein socialism, a popular movement, has in turn influenced sociology, a theoretical science.*

A great many reasons, good and bad, have been given for the Great War, and there are even more predictions for the future of reconstruction than there have been explanations for the Great War. But whether we charge the receding terrors of the war or the febrile difficulties of the present to bad morals or faulty education of the people themselves or of their leaders, whether we regard the situation as good or ill in the hands of the slowly developing juristic system wavering between excessive social control and excessive individual liberty, or whether we throw the whole onus upon the shoulders of blind economic development, we would make a bad error if we left theory, science and philosophy out of the account.

THE BANNER OF THEORY.

It has struck me that one of the nearest duties of the Engineering Foundation, in entering work upon the mental hygiene of industry, is to carry the banner of theory rather more proudly than it is sometimes carried. The engineer, especially the modern personnel manager, is no doubt most receptive to whatever his colleagues from other arts and sciences have to bring.

I look to no concrete results from those widely advertised industrial conferences held in our country in the latter part of 1919, simply because management and the engineering profession in all its branches were, in so far as I could make out, not properly represented. Capitalists who have once been engineers are capitalists notwithstanding. Labor leaders are prejudiced, and no doubt rightly so, for the practical purposes of their leadership. The public has interests that are diffuse rather than concrete, and has no specialized knowledge either of financial systems and conditions of labor or of the theory and practice

* That ologies can influence isms is shown in two other examples that may be borrowed from Merz's analysis. Fichte, in some ways the most German of philosophers, wrote a short tract in 1800 called "The Closed Industrial State," and in 1826 the independent, landed proprietor, Von Thunen, wrote a somewhat similar work entitled "The Isolated State with Respect to Agriculture and Economics," giving algebraical formulæ for the natural wage of labor by eliminating rent. I commend to every reader the tenth chapter of Merz's work entitled "Of Society," especially any reader who doubts the relation of theory to practice in the development of the present human situation. Written as it was before the Great War (the fourth volume published in the year 1914), this work gives the most comprehensive brief account of the total situation which we now possess.

of management. But when the overconservatism of capital and the overradicalism of labor and the nebulous vagaries of the public shall have failed, as they will surely fail, to solve the industrial problem, then will be the time for engineers, in the broadest sense of that term, to be thrown into the game.

But expert engineers who "make the wheels go 'round'" are not quite so authoritative when it comes to questions of the wheels themselves: Shall the wheels be turned at all? At what rate? And especially, What new wheels shall be called to service? I spoke above of the causes of the Great War as possibly lodging in a faulty education, in evil morality, in a jural system falsely evolving, and in purely economic developments. The problems of reconstruction are likewise possibly mental, possibly moral, possibly incidental to adjustments of government and law, possibly under the influence of economic laws, old or new. It will be the duty of engineers facing industrial problems to deal in no narrow spirit or mere technique with those problems. The problem is beyond the grasp of scientific management except in some broad interpretation of that term which no one would be likely to accept. No mere education of expert managers, of workmen, of the public or even of the capitalists is likely to work, because the problem digs morally far deeper than in education within the grasp of the much-vaunted modern publicity method. But although the problem is not one of scientific management, neither is it one to be solved bodily by the methods of charity and welfare.

JUSTICE THE CRY TO-DAY.

Not happiness but justice is the cry to-day. The representatives of scientific management must come together with the representatives of social welfare. Those who stress the mental element must pool their proposals with those who stress the moral element. Both the efficient engineer and the expert social worker must bear in mind the cry for so-called social justice. Those who raise this cry seem always in some sense to rely upon improvements in government and law, whether those improvements are such as to make us have "faith in Massachusetts," or such as to hearten the legions of Bolshevism. The spokesmen of representative government in America or of the Soviet system in Russia claim with equal vivacity that they are out for social justice, and all intermediate types of politicians not only argue for social justice, but would resent the statement

that the principles of organized welfare work, and, in the end, also the principles of scientific management, would not be successful at all alongside, and even by virtue of, the principles of social justice.

Thus we have advanced appreciably from the standpoint of Carl Marx. Carl Marx stood for self-help, on the part of the scientists. There was no immutable principle of natural justice which would save the workmen. They would have to help themselves, as Lismondi cried: "What! Is wealth, then, everything? Are men absolutely nothing?" Marx's facts, such as they were, seemed to have been derived from Adam Smith, from Ricardo. The statisticians had built up a fabulous but harmless creation, "the average man." Ricardian economists then got up something which proved to be more of a Frankenstein, — namely, "the economic man." The theory of wealth upon its tripod of wealth, wages and profit was the result of British economic thought. The economic man was a machine upon the Ricardian theory, and it was against this mechanical idea of the worker that Carlisle inveighed and Carl Marx leveled his suggestions for a complete overturn of the social order.

THE BEST IS BEHIND SCIENTIFIC MANAGEMENT.

I am inclined to see in the great movements for scientific management, for social welfare and for social justice the best efforts of the Head, the Heart and the Long Arm to solve the problem. Of course, we must not charge the Ricardians of old, any more than a member of the Taylor Society of to-day, with delusions in human sympathy, and no doubt the movement for scientific management in its modern aspect has made much room for the moral motive, particularly in its study of the fatigue factor in industry. Again, it would not do to charge Carlisle of old or Jane Addams of the present day with irrationalism, or with a tendency to behead the system and run it by means of a heart only. As for the representatives of the Long Arm of the law, among the most liberal jurists whom I have had the pleasure of listening to, I fancy that none wants to acknowledge the desire either to behead the social animal or to tear out its heart. To be sure, if one took the principles of Austinian jurisprudence quite literally, the Long Arm and even the Big Stick are its most obvious forces.

NOBLE ENDEAVORS HAVE NOT SOLVED THE INDUSTRIAL PROBLEM.

You will rightly say that I have wandered far from the topic of trade-unionism and temperament. My purpose in thus wandering was to show that a great series of noble endeavors has quite failed to solve the industrial problem. Some economists, both followers of Marx and ardent scorners, are still inclined to think that economics might well be left to solve its own problems, as the blind were once commended to a system of representative leadership by other blind, who, let us hope, had strongly developed the sixth sense. But the Great War and the problem of reconstruction do not argue strongly for the program to let things stew in their own juice. Neither the *laissez-faire* plan, nor the neatly rounded little Utopian systems of one or another economical theorist, practically works. Accordingly the Head, the Heart and the Long Arm of science tried their luck. Scientific management, social welfare and social justice became bywords, each accomplishing something or a great deal according to the times and seasons. One great profession, that of medicine, had no share in these matters, unless very indirectly by influencing university teachers of men of science, moralists and lawyers. To-day we see signs that medicine is to be called in. We cannot otherwise explain the numerous increases of interest in industrial medicine shown in more than one country and by more than one type of agency, official or voluntary, in our own country. Departments of hygiene are securing important contacts with industry, either solving the problems derived from the works, or carrying new laboratory results back to the plants themselves, or, in a few instances, laying down programs for aid in the personnel problem.

I want to make a plea for the inclusion in the program of industrial medicine of the neglected field of mental hygiene. I call attention to the fact that the Engineering Foundation, representing the engineering profession, has taken up concrete beginnings of research upon this problem of the mental hygiene of industry, which will so develop that industry will shortly demand from the psychiatric branch of the medical profession various consultants who will not do their duty, either by medicine or by psychiatry, if they do not look attentively into these new matters. I think the ordinary physician, even the industrial physician, would look upon the topic of trade-unionism as very remote from his interest or knowledge. I am afraid that most

mental hygienists would feel themselves wholly at a loss confronting trade-unionists. Nor will I make extravagant claims for mental hygiene or for its personnel. The problems which mental hygiene will attack are practical problems, and no practical problems are ever solved (so far, at least, as they deal with individual situations) *in camera*. Nevertheless, mental hygiene might have something to say in many problems.

HOXIE'S THEORY OF TRADE-UNIONISM TYPES.

Let us take the late Professor Hoxie's work, "Trade-Unionisms in the United States," published in 1917. Hoxie, according to his introducer, Dr. Downey, was originally trained in the "straitest sect of cloister economics," and was very able to sharpen a keenly analytical mind upon the subtleties of marginal utilitarianism. Hoxie spent more than ten years in intensive study of American trade-unionism, which led him into various fields of inquiry, such as wage theory, socialism, pragmatic philosophy, social psychology, employers' associations, scientific management. His "Scientific Management and Labor" is well and favorably known. I want especially to speak of Hoxie's theory of the four functional types of Trade-Unionism in America. To give some idea of Hoxie's methods, at the same time pointing out some relations of this work to mental hygiene, I propose to list a number of items taken from the report of Hoxie's students upon the trade-union program (embodied in Appendix 2 in Hoxie's book). From paragraph I, "Aims," may be quoted: —

Expression of self, personality, temperament, group philosophy.

Higher intelligence and capacity for enjoyment.

Improvement of working conditions in health, exertion, independence, personal dignity, supervision and control.

Improvement of living conditions and standard of living; uplift of the working class; uplift of the community as a whole; self-help.

From paragraph II, "Principles and Theories," may be quoted: —

Essence of social maladjustment is the wage system.

Low wages cause of most human ills.

Belief in the wage fund theory, or "lump of labor theory," causes opposition to industrial schools and immigration.

All workers are of the same benefit to society, whether skilled or unskilled, and all should therefore receive the same wages.

Competition between man and man is healthy, but between man and machine is injurious to man.

Society's obligation to the worker to help him obtain his rights, including the right to leisure, and right to education.

Organization is essential to freedom from oppression. Cheap workmen's hotels, minimum wage, etc., simply retard the one right way to better things — organization (Might is right when unionists win).

Right and justice are the rules of the game of the ruling class. Unions justified for the good they do, no matter how great the corresponding damage.

Ends justify the means.

From paragraph III, "General Policies," may be quoted: —

Organization for mutual insurance.

No affiliation with welfare plans of other groups.

To act pragmatically.

Make use of —

Self-help only.

Strategic position.

Monopoly.

Strikes.

Boycott.

Violence if necessary.

Methods "within the law."

Mediation.

Arbitration.

Conciliation.

To maintain efficient and high moral character.

To encourage industry, education.

Sabotage.

General strike.

Violence.

To discountenance violence.

To use any method in a pinch.

To educate and uplift union personnel.

From paragraph IV, "Demands," a few items may be quoted: —

Equal pay for men and women.

No piece work.

Abolition of rushers, speeders.

No scientific management.

No change in class.

Protection against occupational diseases.

Sanitary shops.

Abolition of child labor, night labor.

Regulation of hiring, discharge, fining, docking, promotion.

Settlement of disputes.
 Legislative demands.
 Prevention of high-speed schemes.
 Workmen's compensation.
 Old age pensions.
 Public as against private welfare plans.

From paragraph V, "Methods," may be quoted: —

High moral requirement for membership.
 Violence.
 Intimidation of employers.
 Scabs.
 Sabotage.
 Educational work through emotional appeals to public.
 Education of public.
 Inconvenience of public.
 Social ostracism.
 Mutual aid and insurance.
 Grievance boards.
 Moral suasion.
 Control through superior competence and efficiency of union labor.

Practically the whole of paragraph VI, "Attitudes," might well be quoted, since almost every item has some relation to mental hygiene: —

Moral and industrial worth, not wealth, the standard of human greatness.
 Physical power the motive force of everything; might is right.
 The church and the State, the great pillars of capitalist society.
 Contented workman is a pitiable object.
 Those who kick without reason are better than those who do not kick at all.
 Employers can meet with workers on a basis of justice to both, or, on the other hand, "contracts with employers are not sacred."
 Every welfare plan has a joker in it.
 Conflict between materialistic bread-and-butter unionists and the idealistic members.
 Trade-Unionism — the bulwark of capitalism.
 A. F. of L., if not a labor organization, is simply a combination of job trusts.
 When a man gets too wild for the A. F. of L. he goes to the I. W. W., so that the I. W. W. is a good thing.
 A man is a scab when he gets in the way of your job, no matter how badly he needs the money.
 Men's unions have bosses — women's do not.

FOUR TYPES OF TRADE-UNIONISM.

All the foregoing mass of even contradictory and various statements about unionism would form much grist to the psychiatric mill. The point of view of mental hygiene certainly needs to be applied to industry if such analyses of Hoxie's students are at all representative. The insight of Carleton Parker is certainly justifiable.

Perhaps Hoxie's most interesting contribution is his distinction of five function types (four, if we exclude the group of so-called dependent trade-unionism which relies upon the support of other forms of unionism, or is "yellow" in the sense of being created by employers).

These four main types of unionism are —

- Business unionism.
- Uplift unionism.
- Revolutionary unionism.
- Predatory unionism.

Assuming that Hoxie's account of the functional types of trade-unionism is approximately correct, so far as it goes, let us see whether the psychiatrist can find any grist for his mill in an endeavor to learn what these functional types of trade-unionism might mean in terms of the great fundamental psychic trends. Trade-unionism looks like a phenomenon of mass psychology. No doubt the final account of trade-unionism will be in terms of mass psychology, but at the present day we do not know too much about this so-called mass psychology. Moreover, it might be dangerous to apply modern and incomplete ideas of mass psychology to a social problem so red hot as the trade-unionism of the present day.

Very near to the surface of the modern psychiatrist's consideration of any problem is the question of temperament. What temperament may mean in terms of mass psychology is, to say the least, doubtful. We can serve ourselves best with the distinctions of the psychology of the individual, simply because we have no mass psychology, in the matter of temperament. Granting that Hoxie was right in his definition of the functional types of trade-unionism, may we not profitably inquire how his results fit with what we know of temperament. I shall shortly be able to show that four main types of trade-unionism discussed by Hoxie, correspond rather neatly with the

classical types of temperament. However, my first point is not that trade-unionists of one functional type are all temperamentally equipped in a certain way. In the second place, there is no question whatever that the labor leaders in a given way are necessarily men that would prove to be the vehicles of a particular temperament. Nor in the third place is it at all certain that the founders of particular trade-union tendencies give pure examples of a temperament corresponding with their particular unionism. I am rather inclined to think that evidence will be forthcoming to prove the genesis of the different trade-unionisms due in great measure to certain temperamental trends.

FOUR TYPES OF TEMPERAMENT.

I do not trust to my own analysis of trade-unionism, since, indeed, I have no special claim to training that would fit a man for such analysis. Likewise, I shall confine myself to the safe ground of a very ancient account of the temperaments. The psychiatrist cannot help having personal, and even partisan and political, views of a topic like trade-unionism. The psychiatrist, like any other citizen, might therefore import his own private views into the analysis. Without further preface let us consider the classical temperaments as they have descended to us from Hippocrates and Galen. The "temperaments" of these Greek physicians were in the literal sense "humors," and good humor and ill humor have come down to us as results of Hippocratic and Galenical ideas. These men distinguished the following four types of temperament: the phlegmatic, the sanguine, the melancholic and the choleric.

We distinguish sharply the power of a man's intake of sensory stimuli from his motor power of responding in various ways to these stimuli, present or past, but between intake of stimuli and discharge of responses man interposes his intellect and his emotions; the intaken stimuli are somehow combined in the mental processes termed intellectual (that is, inter-ligating). The behavior of man, that is, the shape his responses, muscular and glandular, take, is thus not merely a matter of his sensory intake of stimuli, but also a matter modified by memory, imagination and other intellectual combinations. However, besides sense, intellect and will (to use the old terms for these functions) we have also to deal with a man's emotions that may influence his behavior essentially and sometimes almost regardless of his sensory intake, his intellectual combining power and even the

natural lines of his motor responses. There is an attitude of pleasure, of pain and perhaps of emotional indifference which modifies behavior. These are very inadequate words in which to describe what a man does as modified by what he takes in, mulls over, and has pleased or pained feelings about; but these oversimple words will serve for the moment to make my point, that sensory and motor power on the one hand, and emotion on the other hand, are apparently much more than the intellect. With these same senses, perhaps with the same muscles, the same glands, and no doubt with the same brain equipment, two men might act differently. We should be inclined to ascribe these differences to temperament.

COMPARISON OF TRADE-UNIONISM AND TEMPERAMENT TYPES.

Thus, if we are analyzing trade-unionisms from a temperamental viewpoint, we are not discussing how logically well or ill conceived these trade-unionists are, that is, their intellectual value in the logical world; nor are we discussing their values in behavior, except as behavior is influenced by temperament. Let us now show the four trade-unionisms and the temperaments in parallel columns.

Classical Temperaments.

Phlegmatic.

Sanguine.

Melancholic.

Choleric.

Functional Trade-unionisms.

Business.

Uplift.

Revolutionary.

Predatory.

There are obviously certain logical connections between the ideas conveyed by the terms for temperament and the terms for unionism. The phlegmatic temperament of relative indifference to pleasure or pain of ordinary degrees is precisely the everyday temperament of the majority not only of laboring men and all labor leaders but also of people in general. From business unionists in Hoxie's sense as from all persons with phlegmatic temperament we may expect businesslike reactions, not too highly colored nor influenced by the extremes of temperament. In accordance with the warning previously expressed, I do not wish to say that business unionists may not now and again vivaciously, melancholically or vituperatively argue their points, but the logical machine of the business trade-union in Hoxie's sense appears to be a machine in which vivacity, melancholy and irascibility are not effective forces. We do not regard the es-

teemed leaders of the American Federation of Labor as swayed by their different logical considerations, since we concede their proper partisanship for the men they represent.

As Hoxie sufficiently indicates, the uplift phenomena of unionism are still nigh universally displayed by the different types of craft and industrial unions. Perhaps there is no single actual union that expresses uplift, and nothing but uplift, in its work. Can we not safely conclude, however, that something like what underlies the sanguine temperament underlies the uplift movement? The modern psychiatrist would have to say, concerning sanguine persons, that they are often subjected to an opposite feeling, "the blues." Many such persons, technically called cyclothymic, belong by temperament to the uplifters. Whatever and whoever demands uplift gets the sympathy of these persons, whose interest may shift from week to week and month to month from one proper object of sympathy to another equally proper object. Perhaps we owe much of our effective social welfare work to the existence of the sanguine in the world. Not even their blues, or what were originally called the blue devils, remain valueless, since on the upswing of their temperament they depict in glowing colors the terrible things felt by them when possessed of their devils.

Each of these temperaments, the phlegmatic and the sanguine, has its peculiar virtues. Each of us has felt each trend at different times. Is it not of practical social value to bear in mind the possibilities of these trends to evaluate not only other people's but one's own temperamental trends in this way?

MELANCHOLIC TEMPERAMENT AND REVOLUTIONARY TRADE-UNIONISM.

Perhaps the least obviously effective comparison here made is between the so-called melancholic, or atrabilious, temperament and the revolutionary type of trade-unionism. There is no neat correlation between black bile and the I. W. W. or the I. W. W.'s quasianarchistic forms of unionism. However, there is some suggestion of a parallel in the mental attitude of the revolutionary and that of the confirmed melancholic. The confirmed melancholic, particularly of the more advanced years, is apt to center thought upon certain ideas, which in frank cases of mental disease may amount to delusions. The point that we outsiders must bear in mind which might concern the revolutionary types of trade-unionism is not their emphasis on direct

action, sabotage or violence, but the grounding of all their lives upon definite ideas or hypotheses. The emotional tone of this revolutionary unionism is almost always unpleasant. They are almost always in the state of felt passivity. The passivity they feel simply illustrates for them the passivity in which they conceive the world, especially the industrial world to be.

If we approach the analysis of those revolutionary unionisms with the idea of their actual grounding in unpleasant violences and violences of felt passivity, we shall get on much better than if we try to interpret their behavior along simple lines of direct action. The direct action advocated by Sorel in his classical work on violence is a type of behavior grounded in an hypothesis philosophically held. We can best explain the direct action of Sorel on temperamental grounds, and this entirely aside from the logical accuracy of his conclusions. For aught we know, one or more of the revolutionary types of trade-unionism may be logically quite sound. Our one concern as psychiatrists would be to appraise correctly the share of temperament in the total response or line of behavior taken by the revolutionary under examination, *e.g.*, by the philosophic syndicalist Sorel. Without stopping to inquire whether Hippocrates and Galen would concede our modern analysis of the melancholic temperament to be correct, let us concede that there does exist a type of revolutionary temperament of unpleasant feeling tone and of a felt passivity quite capable of explaining many proposed revolutionary programs.

CHOLERIC TEMPERAMENT AND PREDATORY TRADE-UNIONISM.

Far easier is it to see the choleric temperament in the so-called predatory trade-unionisms. Here are men working not upon the comparatively high intellectual levels of the revolutionary unionists, but upon lower, instinctive levels. The revolutionary and the predatory unionist may advocate and perform the same acts of violence and sabotage. The revolutionary will have his reasons, the predatory will act on impulse; the revolutionary will have a predominating emotional tone of unpleasantness and will feel decidedly in the passive voice, like many a victim of out-and-out delusions. The correctness or accuracy of his belief makes no difference to his temperament. The felt passivity may be actual passivity or a fancied passivity. The effect upon the revolutionary's behavior is the same, whether the felt passivity is real or imaginary. On the other hand, the predatory

unionist may well feel himself frankly and gloriously in the active voice. His emotional tone may be unpleasant enough, though in the midst of anger or serene pleasure. However, the predatory unionist, like any impulsive predatory person, is not a very pleasant fellow on the whole, either taken from the inside or from the outside.

I do not know how sound these parallels between the ancient temperaments and the modern unionism types may be. Upon some such lines, however, I am convinced that we shall learn to distinguish not only the functional types of trade-unionism, but also other types that function in the modern world. We are very far removed from the Average Man of the French statisticians and an Economic Man of Ricardo and his abysmal failure. The world looked for many years for statistical resemblance among men. We should now look for qualitative differences. If it should turn out that Hoxie has made a fundamentally accurate study of the types of trade-unionism, the analytic point of view of modern psychiatry may be of considerable help in the further study of these trade-unionisms. The psychiatrist may not be sure that Hippocrates and Galen were more than approximately correct in their account of the temperaments, but he may be able to add a little here and a little there to the classical doctrine, or he may be able to overthrow the classical distinctions altogether. Upon some such analytic line shall he be able to help the world in its confrontation of many problems.

MENTAL HYGIENE PROMISES HELP IN THESE PROBLEMS.

It will not turn out to be a matter of the Head alone; that is of a particular logical and scientific evaluation of the proposed system. It will not turn out to be a matter of the Heart alone; that is a matter of social welfare, rose-tinted or morocco-bordered by the temperaments of uplifters. It will not be a matter of the Long Arm of the law until the law, so to say, can tell its left hand from its right, can distinguish individuals one from another more than its general relations now permit. Mass psychology and mass psychiatry may be in the future of undreamed proportions and quality. We have only the minds normal and abnormal of the individual man to go upon. Can we discern in the nebulous and mobile outlines of trade-unionism, once more recurrent, the classical trends of temperament? If we can be sure of our analysis here we can no doubt meet the

problems of trade-unionism with much more understanding and with very much more sympathy.

Mental hygiene, I venture to say, as represented both by psychiatrists and by psychologists, will make in the long run a considerable contribution to sociology. Out there we speak in terms, more of dreams than in performance, but for that matter the trade-unionisms are themselves no better off in this respect; nor has the Head with its scientific management, the Heart with its welfare program, and the Long Arm of the law in its ideal of social justice, given us much more than promise.

THE MODERN SPECIALIST IN UNREST: A PLACE FOR THE PSYCHIATRIST IN INDUSTRY.*

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Industrial medicine exists; industrial psychiatry ought to exist. That industrial medicine exists is attested by the founding of national and local societies, journals, personnel groups, and by the pursuit of researches; industrial psychiatry, while it has logical claims to existence, has hardly taken shape. In a paper on "The Movement for a Mental Hygiene of Industry" appearing in *Mental Hygiene* for January, 1920, I have collected those few references which indicate the probable future course of industrial psychiatry, of industrial psychology and of the new field of psychiatric social work as applied to industry. In that communication on the general aspects of the new movement I tried to state the issues for non-medical readers, especially for those advanced engineers, employment managers, and other industrialists who see more in industry than either its "efficiency" aspect narrowly taken, or its "welfare" aspect narrowly taken. I would be pleased if I could, in the present communication, awaken the interest of psychiatrists themselves to what must be conceived as another immediate addition to the community functions of the psychiatrists. In some sense, then, the present communication is a foil to my earlier paper written for laymen on the movement in general.

I seize the opportunity afforded by the fortieth anniversary of the founding of the Boston Society of Psychiatry and Neurology for the present purpose, because that society is well representative of the two sides of psychiatry that have developed, rather independently, from the necessities of the State-care program for the insane, on the one hand, and from the necessities of private psychiatric and neurological (including medico-legal) practice on the other. This society, made up as it is of both kinds of psychiatric practitioner, public and private, ought to be especially sound upon new matters like the develop-

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ment of industrial psychiatry, which touches public, social and individual interests alike. As my hearers are thoroughly aware, between the work of the public psychiatrists — whether busied with hospital administration and treatment or concerned with medico-legal decisions — and the work of private practitioners in neurology or psychiatry — men busied with the individual problems of diseases for the most part falling short of the asylum degree — there has come recently to fairly complete logical development the new field of social psychiatry, — a field wherein the problems of the probate court and the problems of the consulting office are amplified, developed and pursued in a hundred ramifications in the social web. Many of our public practitioners of psychiatry, that is, the institution men of the Commonwealth of Massachusetts, are already convinced of the value of psychiatric social work in this new intermediary field which lies between the fields of public practice and private practice in mental diseases as these fields have been construed up to recent times. The files of the Psychopathic Hospital will soon contain many thousand socially investigated cases derived from Boston and the surrounding metropolitan district. But private practitioners in neurology and psychiatry are also becoming aware of the values of the psychiatric social worker for any private practitioner who takes his job seriously and seeks to solve his psychiatric problems with all modern aids.

The three fields of public, social, and individual practice in psychiatry are thus well logically in mind in Massachusetts, as indeed they are becoming clear to most other Atlantic seaboard States and to all urbanized communities that have faithfully undertaken the work of mental hygiene on approved lines. Yet some of us, I fear, may still regard this intermediary field of social psychiatry more as a theory than a condition. Luckily, the men who think practice more important than theory are fast dying out or undergoing belated conversion through reflection on the successes of theory in the Great War. If, however, you actually do meet one of these incorrigible practical men who will see nothing in theory, it is as a rule enough to show him the results of social psychiatric practice among the relatives of the victims of neurosyphilis — general paresis and the like — to convince him that mental hygiene has unlocked a brilliant and efficacious novelty for public health in its work upon the so-called “syphilis of the innocent.” I make this point about social psychiatric practice somewhat at length, not so much for my present hearers as for others who may read the printed re-

marks and wonder whether after all there exists a personnel to attack such widely ramifying problems as those of industrial psychiatry. There does exist the appropriate personnel for work in industrial psychiatry. There is, to be sure, not enough such personnel; but there do exist competent workers who can be multiplied as soon as industrialists begin to crave this personnel and as soon as psychiatrists see the peculiar values of the new work.

Why do I speak of the mental hygiene of industry? Why should the medical man enter fields like those of psychology and social work, — fields in which he is not competent by special training or by daily experience? We all know that there is a border-line between the work of psychiatrists and the work of psychologists, and that claims and counter-claims have been made by representatives of psychiatry and psychology. Why is it not better for psychiatrists to pursue their own expert ways, leaving psychologists to theirs? We are all aware that heated discussions have taken place in national associations anent, for example, the so-called “diagnosis of feeble-mindedness,” which seems a medical problem to the psychiatrists and an educational problem to the psychologists. It seems to me, however, that although heated discussions upon abstract lines may occur at society meetings, there is absolutely no practical or concrete difficulty in marking out the peculiar uses of the psychiatrists and the psychologists in particular, concrete cases of mental disease or defect. For example, at the Psychopathic Hospital the work of Prof. R. M. Yerkes, psychologist to the hospital, ran with perfect smoothness alongside of the work of the psychiatrists in the hospital wards and the out-patient service. On these practical grounds, as well as on sound theoretical grounds, I conceive that it is both tactical and strategic to place psychiatric art and psychological science under the one head of “mental hygiene,” — a term which has medical suggestions, but which has also equally pronounced suggestions of normality and health. Where so many of our problems in the social division of psychiatric practice lie along this border-line between normal and abnormal, I conceive that the term “mental hygiene” is perhaps the best that can be found to describe the sudden enlargement of the psychiatric range in recent years. But, together with the psychiatrist and the psychologist, I would also range a psychiatric social worker as a third kind of mental hygienist. The mental hygiene of industry will of course require the services of all three types of mental hygienists, as I endeavored to make

plain in my communication for laymen entitled "The Movement for a Mental Hygiene of Industry." As psychiatrists and physicians we shall not forget the importance to mental hygiene in general of mental hospital nurses, of occupation workers, and of specialized types of teachers for mental diseases and defects. But these latter varieties of mental hygienists are not so much in point in the primary field of industrial psychiatry. In that field a working party, composed of psychiatrist, psychologist and psychiatric social worker should, if possible, have added thereto a person skilled in tabulation and statistics.

I have just employed the phrase *working party* in the mental hygiene of industry. Such a working party would be of value in almost all other fields of mental hygiene; for example, in the survey of a State or district, an occupation group, a racial group, or any other special group of persons whose mental hygiene demanded attention. Parenthetically, I am sure you will all agree that there is hardly any group of persons in the world that would not benefit from mental hygienic analyses made upon the triple lines herein indicated. Thus, such a working party, composed of psychiatrist, psychologist and social worker, can already be found in advanced juvenile courts, and even in certain courts for adult cases, and would undoubtedly be of the utmost service in all domestic relations courts. Again, in schools, in various institutions for the care of children, this combined insight would penetrate many a dark corner.

But industry seems to me to be the problem to-day nearest to the hands of mental hygiene. One is impressed with the readiness of industry for such working parties in mental hygiene. The war has brought industrial problems into sharp relief; reconstruction has altered the focus in places, but has not abolished the problem. Above all, there is at the present day the so-called industrial unrest, — a problem met apparently with not too great intelligence, if we can judge by the nullities and silent dispersal of certain national industrial conferences in our country. To be sure, the Royal Commission on Industrial Unrest in England during the war time (1917) did important service in laying down certain concrete findings and recommendations, but those results were war-time results confined to Great Britain. The psychiatrist who reads the Royal Commission reports can scarcely avoid being convinced that greater and more significant results could have been obtained if the principle of the mental hygiene working party could have been adopted in the British investigation.

A word or two is in place about the respective functions of the

members of a mental hygiene working party. For the benefit of those who come to this problem for the first time, let me insist that such a working party is not proposed for the purpose of supplanting the employment or personnel manager or any other major or minor executive in the industrial plant. I hope to convey by the term "working party" the idea of an investigation, occasional rather than permanent, carried out by special officers having the weight of certain connections outside of the industrial plants themselves. Of course the psychological examiner will no doubt prove a relatively permanent portion of the organization of an industrial plant as soon as plant managers get clearly in mind the successes of psychology in the army in the classification of personnel and in the elimination of the unfit through group and individual mental tests. Probably this aspect of the propaganda for mental hygiene may be regarded as properly under way, though in my opinion certain plants have at least been adopting it more as an efficiency device than as a welfare or social adaptive measure. But the tendency to exploit the values of mental measurement for the mere elimination of the individual from a particular plant will be short-lived if we can somehow kindle the spirit of mental hygiene in the whole industrial problem. After all, the psychological examiner will find himself of greatest value in the employment or hiring side of the plant's work. As the years pass, the psychologist may also learn to contribute to the problem of promotion upon lines of vocational psychology. But for the present the psychological examiner, in the narrow sense of this term, will be of decidedly lesser value in the interpretation of the discharge-rate or turnover in industrial plants. The industrial plant should have the list of discharged employees gone over from time to time by a consultant psychiatrist or a neurologist interested in the psychiatric side of this work. Such consultant psychiatrist should be in complete touch with the psychological examiner, and should have at his disposal such records of mental testings or other recorded impressions as the psychologist may have. He should likewise be able to secure and interpret the records of social work, especially those made in connection with discharged employees.

The psychiatric social worker, like the psychological examiner, will probably become a permanent element in the plant, although most of her work may well be done outside its walls in the community, and especially in the families, even of those who become industrially disabled and of those who are discharged, when the

reasons for their discharge are consistent with the spending of the plant's time and money on their families. Luckily, in advanced urban communities the standard of social welfare has been advanced at least to the point reached by the standards of efficiency inside the plants. The result is that by a minimum of exertion on the part of the social worker, proper transfers of these families of discharged workmen to other agencies can be arranged for. Where there are a number of industrial plants in a single community, the social workers connected with these plants would naturally be closely associated with one another in their social conferences and society meetings. Industrialists tell us that co-operation is more the order of the industrial day than competition. However this may be in industry as a whole, there can be no doubt that the social treatment of families of employees discharged from plant A will benefit the turnover sheet of plants B and C, etc. If plants B and C employ social workers of like skill, plant A will in turn benefit in its turnover sheet. In brief, the welfare of the discharged to a certain extent means the efficiency of the plant. The general problem of turnover is aided by the well-known principle of mutual "back-scratching." Meantime, the welfare values obtained for the community as a whole run beyond the superficial relief of the industrial skin.

How soon it will be possible to make physicians in general and medical social workers, not especially trained or expert in mental problems, see eye to eye with the psychiatrist and the psychiatric social worker in this matter of the mental hygiene of industry, is hard to say. However, from the operations of national and local societies of industrial medicine, it appears that physicians in general are becoming much alive to the virtue of this new combination of medicine and engineering. Psychiatry has made such strides in relation to the more superficial problems of social work that psychiatrists are often overwhelmed with the kind and degree of expectation uttered by social workers. The extreme range of such expectation is shown in the files of the out-patient department in the social service of the Psychopathic Hospital in Boston. Much is expected of the psychiatrist in the new social division of his practice.

It is particularly in the grievances that come to the attention of the employment manager that the psychiatrist will find his work laid out. In the communication on the "Movement for a Mental Hygiene of Industry," above mentioned, I have quoted from Read a list of causes for removal from a certain large

pay roll. The following entries will readily suggest to the psychiatrist what sort of investigation ought to be carried out, especially with the aid of the psychiatric social worker: —

Certain Causes of Removal from Pay Roll.

Did not like supervision.
 Refused to be transferred.
 Resented criticisms.
 Did not like working conditions.
 Work too hard.
 Agitator.
 Carelessness.
 Dishonesty.
 Drinking.
 Fighting.
 Indifference.
 Insubordination.
 Too slow.

There is also a paragraph called “superintendent’s private file” among the “unsatisfactory” groups of removals that might well be looked into by the consulting psychiatrist. Where do all these grudge-bearers, agitators, drinkers, fighters and lazy persons go? Some of them figure within a comparatively short time in the discharge files and turnover analyses of near-by plants. We may talk of the solution of such problems as a duty of the community, but it should not be long before industrial plants themselves recognize the efficiency and welfare virtues of attending as strictly to their human outgo as to their human intake. I mentioned the work of the British Royal Commission on Industrial Unrest in 1917. I present a summary of their findings made by the Right Honorable G. N. Barnes, M.P., not because all of the fourteen items are particularly related to our own or to any special problem in industrial hygiene, but to show the general nature of the Royal Commission’s work.

Summary of the Industrial Unrest Findings in England, 1917, by G. N. Barnes, M.P.

1. High food prices in relation to wages, and unequal distribution of food.

2. Restriction of personal freedom, and, in particular, the effects of the munitions of war acts. Workmen have been tied up to particular factories and have been unable to obtain wages in relation to their skill. In many cases the skilled man’s wage is less than the wage of the unskilled. Too much centralization in London is reported.

3. Lack of confidence in the government. This is due to the surrender of trade-union customs, and the feeling that promises, as regards their restoration, will not be kept. It has been emphasized by the omission to record changes of working conditions under schedule LL, article 7, of the munitions of war act.

4. Delay in the settlement of disputes. In some instances ten weeks have elapsed without a settlement, and after a strike has taken place the matter has been put right within a few days.

5. Operation of the military service acts.

6. Lack of housing in certain areas.

7. Restrictions on liquor — this is marked in some areas.

8. Industrial fatigue.

9. Lack of proper organization among the unions.

10. Lack of commercial sense — this is noticeable in South Wales, where there has been a break-away from faith in Parliamentary representation.

11. Inconsiderate treatment of women, whose wages are sometimes as low as £13.

12. Delay in granting promises to soldiers, especially those in class "W" reserve.

13. Raising of the limit of income tax exemption.

14. The workmen's compensation act: the maximum of £1 weekly is now inadequate.

Among the recommendations of the British commissioners are to be found recommendations concerning —

1. Food prices (of which the commission stated there should be an immediate reduction with an increase price partly borne by the government and with a better system of distribution).

2. Industrial counsels on the principles of the Whitley report.

3. Authoritative statements by the government as to further increase of output (war-time conditions).

4. Participation by labor in the affairs of the community as partners rather than as servants.

5. Publicity in certain matters relative to leaving employment.

6. Publicity by the government concerning its pledges already given.

7. Raising of the £1 maximum under the workmen's compensation act.

8. Announcement of the policy as regards housing.

9. Skilled supervisors to receive bonus.

10. Closer contact to exist between employer and employee.

11. Pensions committee to be granted more discretion. Treatment of men discharged from the army.

12. Certain agriculturists' wages to be raised.

13. Colored labor not to be employed in ports.

14. A higher taxation of wealth (by one commissioner).

According to the commission's report there were the following four universal causes for unrest in England: (1) food prices and distribution of supplies; (2) restriction of personal freedom; (3) card system for military and industrial service; (4) inco-ordination of government papers. Certain acute though not universal causes of unrest were: housing, drinking and fatigue. The commission also speaks of "psychological" conditions, and remarks that "the great majority of the causes of industrial unrest specified in the eight district reports have their root in certain psychological conditions." Among these may be mentioned lack of confidence in the government; feeling of inequality of sacrifice in army and industry; the idea that solemn pledges were broken and turned into "scraps of paper"; feeling of unreliability of certain trade-union officials; and feeling of the uncertainty of the whole industrial future.

The commission was no doubt justified in laying enormous emphasis on what it calls "psychological" conditions. The psychiatrists and the medical men in general must feel that the blanket term "psychological condition" covers a good many psychiatric difficulties. Thus, whoever follows the strong trend to individualization in medicine, psychiatry, in education — both intellectual and moral — and even into the law courts, must be convinced that individualization should proceed to greater lengths in industry. There is nothing more widespread in modern sociology than certain ideas about group action as the "be all" and "end all" of progress and failure in social developments. As one author puts it, group experience leads to group thought, group thought to group action. If we take, for example, the universal causes of unrest summarized by Barnes of England, we shall of course be convinced that food prices might well be a group experience, and a poor distribution of supplies might be to a large extent a group experience. There would also be a group experience of the evils of card systems which might lead to group thought, and unrest of mind might create tendencies to strikes; distribution of supplies would tend to follow group experience and thought, as in the case of prices and service cards. When it comes, however, to a question of the restriction of personal freedom and to a question of government inco-ordination, it must be observed that these are hardly group experiences as much as individual experiences. The workman who objects to being passed automatically from one sphere of labor to another may make himself heard effectively in group thought; the victim of some inco-ordination on the part of gov-

ernment departments may do the same. But it certainly must be true that the effects of such restriction of freedom and of temperamental inco-ordination are, as a rule, individual. The voices of the victims, however, are raised along with the voices of general unrest concerning food prices and the service card system.

We cannot help thinking that the principles of social work and especially psychiatric social work, applied to the problems of the restriction of personal freedom or of temperamental inco-ordination, will solve most of the problems. The matter of automatic transfer from certain spheres of labor is of course a war rather than a peace matter, but the item will serve as well as another to indicate that universal causes of unrest need not be the product of group experience, need not have led to group thought, and need not lead to group action unless in the presence of other more general causes of unrest. Many of these problems, possibly the majority of them, are extraordinary rather than main problems. The same holds for the "acute" as contrasted with the "universal" causes of unrest, most of which acute causes are described by the commissioners as arising locally from different problems, such as family housing, drinking, fatigue, or even such a problem as that of lack of confidence in the government, specified among the findings as lack of commercial sense (No. 10). We find from the commission's report that this lack of commercial sense was especially noticeable in South Wales where there had been a break-away in faith in parliamentary representation. I do not know any single important fact relative to South Wales and its break-away from the democratic faith, but certainly there must have been a local condition which no doubt had local causes, some of which are almost certain to have been due to the operations of a particular man or group of men.

This introduces us to the most general aspect of the unrest problem, the aspect which leads me to give to my paper the somewhat cryptic title of "The Modern Specialist in Unrest." It may be — or, as I suspect, it may not be — that group experience leads to group thought and group thought to group action as the ordinary course of events in social developments. But whether these developments are group matters or not, it remains true that most of the information which we possess concerning group psychology and group psychopathy is derived from the psychology or the psychopathy of the individual. If this statement be accounted true, then I do not need to insist

that the psychiatrist is rather more likely than any other expert to know how the main lines of unrest will run. Unrest on the part of the individual is the big problem of the psychiatrist; year in and year out he comes in contact with the finest, as it were, and the most brilliant examples of unrest in the shape of particular patients in his wards. If this general account of things be correct, the psychiatrist ought to have a message for industry. Psychiatric knowledge about the unrest of the individual ought to be turned to account in our analyses of group unrest.

The main thesis of the present communication is that a psychiatrist has a place in industry. I think that he will have a place in the routine of industrial management, not as a permanent staff member (save in the instances of very large firms and business systems) but as a consultant, at stated periods, relative to the matter of grievances, complaints and dissatisfactions, actual and potential. The function of this occasional consultant would be preventive rather than curative of the general conditions of unrest. How far we can think of the industrial psychiatrist not merely as a preventive agency but as a curative agency for conditions of unrest the future must decide.

What is unrest? The theory that group experience leads to group thought, which in turn leads to group action, may be sound theory for a portion of industrial phenomena, but individual experience, individual thought, and even individual action are also factors in industrial situations. How far is unrest a matter of group or crowd or mass psychology? How far does mass psychology depend upon the psychology of the individual member? It will not be wise to generalize to the effect either that industrial unrest is entirely a group phenomenon or that it takes its rise entirely in the minds or in the hearts of individuals. We have seen that some of the causes of unrest in England might well be matters of group psychology, but that other causes of unrest seem almost in their nature to have been of individual origin.

That portion of the unrest problem which depends not upon group experience but upon individual experience, not upon group thought but upon individual thought, and finally not upon group action but upon individual action, is the proper topic for the psychiatrist. The psychiatrist, particularly in company with the psychiatric social worker, has always been a specialist in unrest — unrest, to be sure, confined within asylum walls. The modern psychiatrist has under more or less definite supervision large

numbers of the so-called psychopathic personalities, — persons who are not insane in a kind or degree to warrant their commitment to institutions, but who are psychopathic enough or in such wise as to benefit from community supervision. It is this modern contact with the psychopathic personalities, with instances of so-called psychopathic inferiority, with psychopathic states, that makes the modern psychiatrist a specialist in a kind of unrest that interests the community very deeply. These psychopathic personalities have been recognized even in the immigration laws and in the official tabulations of the army and navy under the terms “constitutional psychopathic inferiority,” “constitutional psychopathic state,” and similar designations.

It is important for the modern psychiatrist not to “hide his light under a bushel;” he must step forth to new community duties. It is on this account that I conceive that a recent step of the Engineering Foundation, representing the United Engineering Society, is of so much importance. Among the earliest problems undertaken by the Engineering Foundation is the problem of the mental hygiene of industry. To the writer, as the Director of the Massachusetts State Psychiatric Institute, was entrusted a research of definite dimensions, relative to the mental hygiene of industry and the problem of mental abnormalities in relation to industrial personnel. The enlightened officers of the Engineering Foundation immediately found the ramifications in the research of mental hygiene of industry so numerous and so broad that a plan is being mooted for investigation of the entire problem of industrial personnel. On the suggestion of the Engineering Foundation, the National Research Council appointed a committee, composed of representatives of its divisions of anthropology and psychology, educational relations, engineering, industrial relations and medicine, to consider the scope of investigation into industrial personnel.

It seems to me that as psychiatrists we should help this movement wherever it becomes practically possible. The practical possibilities of helping lie in connection with the fact that the majority of our male patients have either come out of industry or are going back into industry in some capacity. Special investigations of the individual patients with respect to their industrial status and future should be made. The information which the psychiatrist possesses concerning personality, temperament, and special abilities, as modified by mild mental disease and defects, should be at the call of the employment manager. There should be a drawing together of the psychiatric and

industrial interests of all communities. The psychiatric social workers of the State institutions should meet similar workers from the industrial plants to discuss the individual fates of particular discharged workmen. Psychopathic persons can be fitted into industry far more successfully than most psychiatrists and industrialists are fain to believe. The employment work at the Psychopathic Hospital during the last four years has definitely shown these adaptations of the psychopathic employees to be both numerous and effective.

I do not need to rehearse to this audience the early conclusions of Dr. Adler concerning unemployable personalities, based upon Psychopathic Hospital studies, more than to recall the immediate subdivisions which he made into the problems of fitting into industry (*a*) the feeble-minded, (*b*) the cyclothymics, and (*c*) the paranoiacs. Every employment manager is aware of the existence of the feeble-minded and of their availability for certain kinds of work. Industrialists are also quick to recognize the cyclothymic with their ups and downs of emotional mood as actual inhabitants of mills and mines, and much can quickly be taught the employment manager concerning the special virtues and faults of these victims of the cyclothymic constitution, and even of the more severe forms of manic-depressive psychosis. The paranoiac patient is ready to be recognized by the employment manager as a man with a grudge or chip on his shoulder. In fact, the task of letting in a little psychiatric light upon these problems is not so difficult as might be conceived; the success of Psychopathic Hospital clinics for employment managers in the summer of 1919 attests the value of spreading these practical doctrines of mental hygiene among industrialists.

A CASE OF MYXEDEMATOUS PSYCHOSIS: CLINICAL AND PATHOLOGIC REPORT.*

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INTRODUCTION.

In 1873 Gull described five cases of a peculiar disease under the title "On a Cretinoid State, Supervening in Adult Women," and explained the similarity to sporadic cretinism, which was described by Hilton Fagge. In 1877 Orth reported five similar cases, and noticed especially the condition of the skin, in which he found an excess of mucin. He accordingly named the disease myxedema. He found also, in a case that came to necropsy, atrophy of the thyroid gland, which was previously noticed by Curling in a case of sporadic cretinism.

An exact understanding of this condition, however, is dated from the time when Reverdin and Kocher recognized cachexia strumipriva, and when the same condition was brought out experimentally by removing the thyroid.

Semon is the first one who claimed definitely that myxedema, cachexia strumipriva, sporadic and endemic cretinism are in the same disease group, and are characterized by the failure of the function of the thyroid.

Alcoholism, syphilis and numerous pregnancies, especially when accompanied with much loss of blood, have been thought to be the cause of myxedema. Kocher described a case in which myxedema was accompanied by gummatous syphilis of the thyroid, both being cured by iodine treatment. The same author observed another case in which actinomycosis was the cause of the disease; the patient was cured by incision and drainage. Sometimes myxedema is found in conjunction with goiter. These cases are reported by Murray, Heinzheimer, Gantier, Robertson, Imredy, Hischl, Ulreich and others. Among the most important causes of the disease are also acute infectious diseases, such as typhoid, malaria, acute rheumatism, pneumonia, etc.

Though the disease is found nearly everywhere, it is said to be

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more frequent in England, France and Switzerland. It occurs in cold climates rather than in the tropics, but it is not common in North America.

Women are far more frequently afflicted than men. Prudden found 145 cases, — 32 men and 113 women; Murray, 425 cases, — 55 men and 370 women; Heinzheimer, 127 cases, — 10 men and 117 women. The predisposition of women is probably due to frequent congestions and toxic infectious disturbances of the thyroid during menstruation, pregnancy, menopause, etc.

The most pronounced symptoms are myxedematous infiltration of the body, dryness of the skin, falling of the hair, slowness of the movements and certain nervous and mental symptoms. Sensory organs are often afflicted; hearing, taste and smell are diminished. Deafness is quite common, and it is thought to be of central origin. The extremities, lips and nose are cold and cyanotic, circulation is slow and the pulse rate varies from 50 to 65. Cerebellar symptoms due to the disease were reported in 1910 and 1911 by Söderbergh.¹ He observed cases with adiadokocinesis, Babinski's cerebellar catalepsy and exaggerated irritability of the muscles, but without symptoms of dementia.

The frequency of myxedematous psychosis is differently reported by various authors. Wagner and Jauregg² gave a percentage of 15. In the majority of cases the psychosis occurred late, after many years' duration, but in a few cases the psychosis occurred in the beginning of the disease, as reported by Pilcz, Inglish and Sierau.

The symptoms of the psychosis are not characteristic. Most patients seem to be demented, with more or less delusions, which are not infrequently based on hallucinations. The delusions are apt to be persecutory in character. The tendency to misbelieve is claimed to be one of the characteristics of the disease, and is an important factor in the development of the delusional conditions. Under the influences of persecutory ideas, patients are apt to become disturbed, cry, become agitated and sometimes extremely violent. In other cases there are reported several different symptoms, such as grandiose ideas, manic exaltations, or melancholia, anxiety and suicidal ideas. The latter cases are reported by Pilcz, Kraepelin, Show, Inglish, Beadles, Clouston, Hamilton, McLane and others.

The most important pathologic anatomical finding is that of the thyroid; even by palpation the organ shows remarkable atrophy. At necropsy it weighs one-tenth of the normal gland.

Burghart observed a case in which he could not demonstrate any gland tissue. Some authors, such as Cunningham, Robinson, Corkhill, Schwass and others, have reported cases of enlarged thyroid in living patients. Microscopic examination shows marked increase of fibrous tissue. Some authors observed lymphocytic infiltration in the parenchyma in the early stage of the disease. According to Prudden, the parenchyma of the gland is more or less completely replaced by fibrous tissue and by newly formed reticular tissue in which are lymphocytes, resembling the tissue of the lymph nodes.

The majority of authors consider that the increase of the connective tissue is secondary, and that the primary cause is the atrophy of the gland tissue, which is probably due to some toxic agent. Ponfick believes in the possibility of a primary infection of the interstitial tissue which may give rise to secondary atrophy of the gland tissue.

The pituitary body is often found enlarged, as in the cases of Boyce and Beadles, Ponfick, Murray and others, but in one case Ponfick found atrophy of the gland. The relation of the pituitary body to myxedema still remains obscure.

No characteristic, regularly appearing findings have been reported in other organs of the body. The pathologic anatomy has given no satisfactory explanation for so marked disturbances in the mental and psychical realms. Brain, spinal cord and nerves are found either normal (Hun, Prudden, West and Harely), or the findings are not absolutely characteristic.

In about half of the cases atheroma of the aorta and large arteries has been found. Endarteritis of the small arteries is also one of the frequent findings.

In the Danvers State Hospital laboratory we have had two cases of myxedema in a total of 2,130 necropsies, beginning in 1879 and ending in the present year. The necropsy of the first case, a forty-five-year-old female, case No. 15840, was performed (Nov. 16, 1910) by Dr. A. H. Peabody.³ The clinical symptoms and pathologic findings correspond to those of a typical case. But, I regret to say, I could not study that case in connection with the present one, because the brain was not available and the description concerning the central nervous system is missing. Some of the clinical and pathologic symptoms, however, show striking similarity to the present case, and will be referred to later in the discussion. The second case is the present one, of which we have been able to make a thorough study and to report as a typical case of myxedema.

REPORT OF A CASE.

Clinical Observation.

History (Danvers State Hospital, Clinical No. 21477). — There was no history of nervous or mental diseases in the family, so far as was known.

The patient was born Jan. 1, 1853, in Nova Scotia. Early development showed nothing abnormal. She had very little education, and did not go to school until she was nine or ten years old, and then only for six months. She could barely read and write. She left home at eighteen to do housework, and when about twenty married her cousin, by whom she had two children, one of whom died in infancy. Her husband died of typhoid and pneumonia two years after marriage, and shortly after that she came to the United States (about forty years ago), and did general housework. Thirty-eight years ago she married again, and had three children, one of whom died in infancy. The informant stated that the patient had some pelvic trouble ten years ago when about fifty-five years of age, and was operated on for two large broad ligament cysts on the right side; at the same time her appendix was removed.

Since that time she had been gradually failing, both mentally and physically. Her memory, especially for recent events, began to fail. She had had many attacks of vertigo, sometimes falling to the floor. These symptoms have gradually been growing worse, especially during the past year. About a year ago she was in danger of losing her home, and her son took her to his home and tried to keep her with him. She had always been very stubborn, self-willed and dictatorial, and insisted on having her own way. He could do nothing with her, and during the past year her daughter has been taking care of her. She became very untidy, and would wander about on the streets attired very carelessly. She persisted in going back to her own home. She would put things away, lose them, and then accuse her daughter of stealing them. At times she seemed depressed. She threatened to commit suicide, and on one occasion she tried to turn on the gas. Her daughter was afraid to leave her alone in the house. She would meddle with the cooking, and spoil the food by putting salt in it; she was dull and stupid, sleeping a good deal during the day. Her appetite was capricious; sometimes she ate an enormous amount. She was admitted to the Danvers State Hospital March 24, 1919.

Physical Examination. — General: Her height was 4 feet 8 inches; her weight, 130 pounds. She was well developed and well nourished. The skin over her face and neck was pale yellowish and waxy. The musculature showed poor development, not much tone. Edema of the face, arms and legs was pronounced. The hair was grayish and very sparse; she was bald over the vertex. There was a linear scar extending from the umbilicus to the pubic bone.

Thoracic, Respiratory and Circulatory Organs: Results of the examination were negative except that respiration was slow, 14 per minute, and the pulse rate was only 60 per minute. The body temperature on admission was 98.8 F.

Digestive and Abdominal Organs: Teeth were missing in the upper jaw, and a few stumps remained in the lower jaw. The breath was fetid. The tongue was extremely large and flabby and was slightly coated. The abdomen was large and pendulous.

Genito-urinary Organs: No internal examination was made. The urine (March 27, 1919) was cloudy and straw colored. The specific gravity was 1026. It was acid and showed a trace of albumin, mucous threads, epithelial cells, a few leukocytes and a few oxalate crystals, but no sugar. The Wassermann reaction on the blood serum was negative.

Nervous System: General Sensations: She said that she had a feeling of weariness and exhaustion and wanted to sleep all the time. When she arose she was extremely dizzy and sometimes fell.

Eyes: The eyelids were so puffy that her eyes were almost invisible. She complained that her vision was poor; the pupils were unequal, the right being smaller, and they were very sluggish in responding to light.

Ears: She was totally deaf in the right ear, and could only hear when one shouted in the left ear.

Taste and Smell: These were apparently normal.

Cutaneous Sensibility: Tactile appreciation was somewhat impaired. She found it difficult to differentiate between pin prick and pencil. She was not always able to localize for time and space. She complained of numbness of the left arm and leg.

Deep Sensibility: There was no tenderness of the nerve trunk on pressure. The stereognostic sense was good.

Vasomotor Condition: There was an almost general edema, more pronounced in the face, hands and feet, and considerable abdominal ascites.

Reflexes: The knee jerks were sluggish, especially in the left knee. There was no ankle clonus. The organic reflexes were impaired.

Motor Functions: Motility of the facial muscles was poor, owing to the general edema. The tongue protruded in the median line. There was no tremor. The gait was unsteady. Co-ordination of movements was poor. She was unable to balance herself without assistance, and could not stand in the Romberg position. She had fallen several times, and said this was due to dizziness. She slept all night and the greater part of the day.

Mental Examination. — **General Appearance and Attitude:** Her face was so waxy and expressionless that with a little "touching up" her resemblance to a clown would be striking. She lay in bed in a sort of stupor most of the time.

Speech: Speech was thick, and she talked in a harsh, raucous voice.

Consciousness and Orientation: She was partially oriented. She knew that she was at Danvers, but was not oriented for time and person. She said it was 1993.

School Knowledge: This was very meager.

Calculation Ability: Her ability to calculate was very poor.

Hallucinations: She had had no hallucinations so far as could be ascertained, and there was no history of them.

Memory: Her memory for remote events was fairly good, but poor for recent events.

Judgment: It was impossible to elicit any definite delusions. She said she did not get along very well with her husband, but denied that it was her fault. She said that everybody tried to boss her around, and she could not stand it any longer. She admitted that she was a little forgetful, but she could remember what happened twenty years ago as well as any one. She was lacking in insight.

Emotions: She was not at all emotional; in fact, she was dull and apathetic. She showed no apprehensiveness, and had not been irritable since she came to the hospital.

Social Relations: She was untidy in her habits, but otherwise caused very little trouble.

Course of the Disease. — March 27, 1919: Slept most of the time. Rather stupid; inordinate appetite.

April 4: She was stupid and sleepy; very deaf; disoriented; no delusions.

April 22: She failed gradually and died to-day.

Post-mortem Examination.

(Made twenty hours after death.)

1. *Gross Anatomy.* — **General Description:** The body weighed 57 kg.; its length was 150 cm. The body was that of a well-developed and well-nourished female, aged sixty-six, but apparently older. The skin over the face and neck was yellowish; other parts were grayish white. The face, chest, upper and lower extremities showed edema. There was rigor mortis. The hair was grayish and very sparse, and the head was bald over the vertex. The face was waxy and reminded one of a clown's face. The eyelids were swollen and edematous; the palpebral and orbital conjunctivæ were edematous and injected; the pupils were slightly irregular; both measured 4 mm. The nose was broad and swollen, but otherwise not remarkable. The teeth were poor; many were missing. The tongue was thick and coated. There was no discharge from the ears. There was a small nevus in the submental region. The thyroid was not palpable. The chest was well formed. The abdomen was flabby and pendulous. There was a scar extending from the umbilicus to the pubic bone. There were marked striæ. There was an exostosis over the upper part of the right tibia. The lymph nodes were not palpable.

Ventral Section: The fat over the chest measured 1 cm., over the abdomen, 2.6 cm., and was very pale in color and of fluid-like consistency. The muscles were pale in color, and were also edematous. The omentum was folded back over the transverse colon, and was rich in fat. The stomach was markedly distended. The appendix was removed; also the right ovary. The uterus was in midline. There were no adhesions around the gall bladder. The spleen was free.

Thoracic Cavity: The mammary vessels stood open on section. The

lungs did not meet and were retracted. There were no adhesions around the lungs. The pleural cavities contained free fluid. The pericardial sac was enormously distended, and contained an increased amount of straw-colored fluid.

Heart: It weighed 470 gm. and measured 12 by 13 by 6 cm. The descending branch of the left coronary artery was remarkably sclerosed, and a part of it practically occluded by yellowish atheromatous softening. The measurements were: tricuspid valve, 11.5 cm.; pulmonary valve, 8 cm.; mitral valve, 9.5 cm. The mitral valves were calcified and contracted. The ostium admitted more than three fingers. The aortic valve measured 7 cm. The cusps were thickened. Origins of the coronaries were remarkably calcified. The left ventricle wall measured 2.2 cm., the right ventricle wall, 0.6 cm. The cardiac muscle was pale and soft.

Left Lung: The left lung weighed 400 gm. and measured 22 by 16 by 4 cm. There was no apical scar. The anterior edge of the upper lobe was emphysematous. The surface of the lower lobe was grayish in color. The cut surface was dark red; dark colored blood oozed from the lung; there was no frothy fluid. Sections floated. The bronchial wall was injected and covered by hemorrhagic fibrinous exudation. The peribronchial lymph nodes were enlarged and pigmented.

Right Lung: It weighed 480 gm. and measured 21 by 18 by 5 cm. The anterior border of the middle lobe was emphysematous. There were hardened areas in the lowest lobe. The cut surface showed an irregular, slightly elevated induration around the bronchi. The bronchial wall was markedly injected. On pressure, bloody, frothy fluid oozed from the lung. Sections floated.

Liver: This organ weighed 1,430 gm., and measured 24 by 19 by 7 cm. The capsule was thickened and slightly opaque. The surface was slightly granular. The color was partly greenish blue and partly reddish. The cut surface showed slight evidence of congestion and fatty change. The gall bladder contained small, sandy stones which were dark in color and crumbled easily. The wall of the gall bladder was injected.

Spleen: It weighed 170 gm. and measured 12 by 8 by 4 cm. It was pear shaped. The capsule was thickened. The surface was granular and clouded. The organ was of unusually hard consistency and there were four fetal lobulations. The cut surface was dark red. The pulp did not bulge and was not easily scraped away. The malpighian bodies were hardly visible.

Left Kidney: This kidney weighed 110 gm. and measured 9.5 by 5 by 3.5 cm. The fatty capsule was increased. The fibrous capsule stripped with some difficulty. The surface of the organ was markedly granular. There were many small cortical cysts. The cut surface was pale in color. The cortex measured 0.4 cm. The pyramids were not well defined and there were whitish striations in the pyramids which suggested increased interstitial tissue. The pelvic fat was remarkably increased.

Right Kidney: The right kidney weighed 110 gm. and measured 10 by 6.5 by 3 cm., otherwise the description was the same as for the other kidney.

Suprarenals: The cut surface showed some increased yellow deposits.

Thyroid: The thyroid was very small; it weighed 10 gm. Careful dissection revealed no isthmus. The cut surface showed no proper structure of the thyroid gland. It appeared to be represented by some fatty and more fibrous tissue. It was fairly firm in consistency.

Parathyroid: The parathyroid glands could not be identified.

Genito-urinary Tract: The bladder was contracted and contained no fluid. The mucous surface was not remarkable. The vagina was smooth. There were small hemorrhagic areas. The uterus contained turbid fluid; the wall was hemorrhagic and firm in consistency. Section showed abundance of vessels and increase of fibrous tissue. The right ovary was absent, and the broad ligament was adherent to the stump of removed appendix; the left ovary was smaller than normal. The surface was greatly roughened and firm in consistency. Cut surface showed dilated vessels and small cysts.

Gastro-intestinal Tract: The stomach was distended and contained a greenish mucoid fluid. Mucous membrane was injected. The intestines contained a chocolate colored fluid. The intestinal walls showed a bluish green discoloration, probably of post-mortem change. The colon and rectum were not remarkable.

Pancreas: Nothing remarkable was found in the pancreas.

Head: The scalp was thick and adherent to a dense calvarium. There was no diploë. The calvarium was somewhat thickened. The grooves for the middle meningeal arteries were not deep.

Brain: The brain weighed 1,000 gm. The dura mater was thickened. The pia mater was irregularly thickened and showed milky cloudiness over the vertex. The brain was soft and edematous. Superior surface of the brain: There was congestion of the veins, especially on the left side. The pia mater was adherent everywhere over the lateral surface of both hemispheres. A large part of the right posterior central convolution was remarkably narrow. Convolutions of the right cuneus, especially bordering on the margin of the hemisphere, appeared much atrophied. The posterior part of the right lingular gyrus was markedly sunken from the surface. The upper part of the left posterior central convolution and left superior parietal convolution was much narrower than normal. The angular gyrus of the left side was also atrophic. Base of the brain: The cranial nerves were not remarkable. The basilar artery and internal carotids were remarkably sclerotic. The pons appeared smaller than normal and resistant to the touch.

Cut surfaces of the brain (Meynert's section): Nothing remarkable was found, except that the above-mentioned atrophic convolutions appeared also atrophic on section.

Pituitary Body: This was slightly smaller than normal and was firm in consistency.

Internal Ears: Nothing of note was found in regard to the internal ears.

Spinal Cord: Nothing remarkable was found in the spinal cord.

Anatomic Diagnosis: The body was well developed and well nourished, and there was myxedema of the entire body. The fingers were cyanosed. The conditions noted included alopecia, a waxy clown-like face, irregular pupils, poor teeth, thick tongue, operation scar on the abdomen, exostosis over the upper part of the right tibia, myxedematous condition of the muscle and fatty tissues, ascites, the appendix and the right ovary missing (by operation). There were also hydrothorax, hydropericardium, dilatation and hypertrophy of the heart, arteriosclerosis of the aorta, major arteries of the body and coronaries; also basilar and cerebral arteriosclerosis; increased pericardial fat, emphysema of the lungs, hemorrhagic fibrinous bronchitis, broncho-pneumonia of the right lower lobe, congestion and fatty change of the liver, cholelithiasis, a large spleen with increased trabeculation, fatty and fibrous replacement of the thyroid, chronic endometritis and eburnation of the calvarium. Diploë was absent. The brain was small, weighing 1,000 gm. There were chronic pachymeningitis, chronic leptomeningitis and irregular atrophy of the convolutions.

2. *Microscopic Anatomy*. — (a) General Histologic: Thyroid: This was almost completely replaced by fibrous tissue. The ordinary tissue was extremely atrophied, appearing here and there like tiny islands. The thyroid contained practically no colloid matter. The remaining gland tissue was infiltrated and surrounded by small spheroidal or lymphatic cells. In some parts the small lymphatic cells occupied the place of the gland tissue and gave the appearance of the normal lymphatic tissue of the lymph nodes. The small arteries, both in the newly formed lymphatic tissue and in the connective tissue, were remarkably thickened, but showed no perivascular infiltration.

Pituitary Body: The anterior lobe was somewhat smaller than normal and the posterior lobe was remarkably small. The cells of the anterior lobe appeared rather numerous and compact, and the acidophilic cells had increased in the central part as well as in the periphery. The intermediate part extended further into the posterior lobe, but showed no evidence of secretion of colloidal matter. There was slight thickening of the walls of the vessels, and they were infiltrated by lymphocytes, differing in this respect from the vessel picture in the thyroid.

Uterine Wall: There was a formation of a thick layer of newly formed, very vascular tissue over the surface of the mucous membrane.

Ovary: There was a formation of dense new interstitial connective tissue around the walls of the arteries and the surface of the organs. The veins were dilated. Here and there obliterating endarteritis appeared.

Adrenals: These showed a moderate grade of fatty degeneration.

Pancreas: Nothing remarkable was found in the pancreas.

Spleen: Chronic indurative splenitis with abnormally increased pigmentation (hemosiderin) in the cells of the pulp was found.

Lung: The right lower lobe showed exudative pneumonia about the bronchial tubes forming the lobular areas.

Heart: There was brown atrophy of the cardiac muscle with areas of scar formation.

Liver: Chronic congestion and fatty change were found.

(b) Microscopical Findings of the Brain: Pieces were taken from the superior frontal, anterior and posterior central, Heschl's transverse and superior parietal convolutions of both hemispheres; also calcarine region, cornu ammonis and several other parts appearing atrophic by macroscopic observation. These pieces were cut by frozen section and by embedding in paraffin, the latter for the purpose of staining by thionin, hematoxylin-eosin, Van Gieson and glia method, the former for fat staining, modified Weigert-Pal's staining and Bielschowsky's silver impregnation.

Hematoxylin-Eosin and Van Gieson's Method: The pia mater was irregularly thickened, especially over parts of convolutions which appeared atrophic. The vessels of the pia mater and upper cortex layer showed marked arteriosclerotic alterations. The thickened parts of the pia mater and the cortex underneath, which often had sunk from the surface, contained numerous amyloid corpuscles. Here and there walls of vessels were calcified. Small vessels appeared to be much increased, disturbing the cell order of the cortex. The width of the cortex was irregular. In highly atrophic parts, such as those mentioned above, and in the neighborhood of the thickened vessels coming down from pia mater, the ganglion cells of the cortex had entirely disappeared, glia cells and glia fibers occupying such areas. The vessels in the deeper layer of the cortex and in the white matter were also thickened and showed marked perivascular gliosis.

Thionin Staining: There was marked disorder of the cells in the superficial cell layers, especially in those of the frontal, anterior central and posterior central convolutions of both sides, right cuneus, posterior part of the right lingular convolution and left angular gyrus. In the deeper parts of the cortex the cell order was fairly regular, although there was some deviation of apical dendrites and some slight disarrangement of the cells. This condition suggested that the cortex layers supplied by short pial vessels had suffered more than the deeper cell layers which were nourished by medullary branches.

The cell changes can be divided roughly into three different groups: —

1. *Cell Sclerosis (Nissl⁴) combined with Fatty Degeneration.* — This change was found in almost all of the cells of the second and third layers (Broadmann) and the majority of the deeper layers. These sclerotic cells showed dark stained nuclei often of elongated, pyramidal or polygonal shape. The protoplasmic body was also darkly stained and remarkably shrunken, making the border between protoplasm and nucleus obscure. The apical dendrites were well stained and traceable to a greater distance than in normal cells. Most of the apical dendrites of the second and third layers took a winding course. These sclerotic cells carried on their side or on their base protoplasmic reticulum which contained greenish and yellowish looking lipid masses. A few of the apical dendrites contained also a lipid mass and appeared to be swollen. This fatty sele-

rotic degeneration was found more markedly in atrophic parts of the cortex than in other places.

2. *Fatty Degeneration with Granular or Heavy Degeneration.* — The cells of the deeper layers and the large cells of the third layer contained a remarkably large amount of fatty pigment. The protoplasmic reticulum containing fatty pigment was located either on the base, the side of the cell or over the apex. The nuclei of these cells were stained a little deeper than normal, showing a wheel-like structure or a nebulous, less distinct structure around the nucleus. The nucleus was located eccentrically, owing to the pressure of the deposited fatty substance. It was irregular in most of the cells. The membrane of the nucleus was more or less preserved. Nissl's granules in these cells were either in good condition, finely granulated or had disappeared. Betz' cells, the large cells of the post central region, superior temporal convolutions and calcarine region showed a fairly good condition of Nissl's bodies. In the cells of the other parts granular degeneration predominated or the cells showed dark stained protoplasm with a net-like structure in it.

3. *Cell Change associated with the Edematous Condition of the Brain.* — This kind of cell change is found both in the superficial and in the deeper layers, combined with other cell degenerations. Nissl is the first author who gave attention to this condition of the cells. The protoplasmic part was torn apart from the nucleus or from the protoplasm around the nucleus. In some cells a crevice was observed across the width of the protoplasm or a vacuole-like cavity in several parts of the cell, some in the base or sides, others in the apex or even in the apical prolongation. The cavities were irregular in shape and appeared to be made by pulling apart a portion of the cell. At first these cavities were thought to be the remains of fat globules which had been dissolved by alcohol, but it was found that the same cavities were present in formaldehyde fixed specimens stained with scarlet red without the use of fat solvents. In the cornu ammonis the same condition of cavity formation was found around the nucleus showing a wide space between the protoplasm and nucleus. This kind of cell change is said to occur in cases in which the brain is found to be soft and edematous at necropsy. It is possible to cause this kind of cell change by the use of the reagents which withdraw water instantly from the brain tissue. Simchowicz⁵ says: "These cell changes are artefact to a certain extent, inasmuch as they are caused by fixing, but they may also be considered pathological, as their formation under fixation is the result of a definite pathologic condition, *i.e.*, an edema of the brain."

In our cases the brain was taken out twenty hours post mortem. Before fixing in formaldehyde it was soft and edematous. We could not, of course, be sure how great a rôle the post-mortem change played in this condition. The body, however, was kept cold (25° to 30° F.) and the weather at the time was very cool, and other brains coming to necropsy under the same conditions showed no such change. Moreover, the skin,

fatty tissue and the muscles showed edematous condition due to the disease. There is no reason, therefore, why the edematous condition of the brain should be exempted from the pathologic change due to the myxedematous condition. Admitting that this cell change is partly artefact, caused by fixing solution, it must still be regarded as pathologic because of the body disease and the condition of the brain, which gives rise to this change.

Bielschowsky's Staining: This staining showed very plainly the alterations of small vessels, especially the so-called arteriofibrosis of Friedmann, which Simchowicz and Fuller ⁶ have illustrated in their papers and called attention to as one of the essential findings of senile changes. The arteriofibrosis was found more markedly in vessels of the upper cortex layers. Degeneration of the cortex beneath the pial covering and the scar formation around the arteriosclerotic vessels were observed. Sclerotic cells with fatty degeneration as compared with Nissl's staining showed dark stained protoplasm and nuclei with elongated apical dendrites. Intracellular and extracellular neurofibrils showed segmentation. Larger cells of the deeper cortex layer possessed pale stained nuclei and fairly well-preserved intracellular neurofibrils. Fatty degeneration and cell changes caused by the edematous condition of the brain tissue were also observed.

Scarlet Red Staining: Fairly abundant fat corpuscle cells were found in thickened parts of the pia mater. The walls of the vessels of the pia mater and of the brain showed fatty degeneration. Fat corpuscle cells were found around the vessels and the highly degenerated cortex parts. Fatty degeneration of the ganglion cells is one of the most striking features of this case. All cells of the upper and the deeper cortex layers showed a deposit of an extremely large amount of fatty pigment substance. This condition existed over the entire brain tissue, while in the degenerated cortex and in the cornu ammonis it was perhaps most prominent. Spider cells of the surface layer and the large pale stained nucleus of the glia cells showed marked fatty degeneration.

Myelin Sheath Staining: Tangential fibers were to a marked degree destroyed, here and there showing the remains of fine fibers and some hypertrophic ones. In the highly degenerated cortex the myelin sheaths are lost. Supraradial cross striations (Supraradiaere Flechtwerke) were scarce. In the white matter there were degenerations running longitudinally with the vessels.

Glia: The glia cells were increased, especially in the deeper parts of the cortex and the white matter. Small dark stained nuclei were not so numerous as pale stained, larger forms with large nuclei which were often stained metachromatically. Around these were often observed (by thionin staining) yellowish and greenish appearing lipid granules which stained markedly with sudan or scarlet red. This condition of lipid accumulation around the nuclei was seen more distinctly in the cortex than in the white matter. In the neighborhood of the vessels of the white matter and the cortex, glia cells were remarkably increased.

Weigert's Glia Staining: The surface glia layer was distinctly broader than normal, some of the fibers reaching deep into the cortex. The glia fibers were also increased remarkably in the atrophic parts of the cortex and around the thickened vessels. On the cortex surface where the atrophic parts had sunk from the normal level, the glia fibers were denser and penetrated deeper into the cortex. The whole feature of this picture of increased glia fibers is like a wedge form. The glia fibers consisted of a small number of thick fibers and a large number of finer and delicate ones. There were also areas in which glia fibers were growing into the pia mater, deep into the pial tissue. Corpora amylacea were very abundant in the atrophic parts of the cortex and the pia mater, where the glia fiber proliferation was most prominent.

(c) Microscopic Examination of the Cerebellum: Scarlet Red Staining for Fatty Degeneration: Purkinje cells stained diffuse brownish, showed no fat corpuscles or granules. Dendrites were not visible. There was a small number of fat corpuscle cells in the Purkinje cell layer. Walls of capillaries and arteries showed fatty degeneration and a small number of fat corpuscle cells were seen around them. There were a few corpora amylacea in the deeper part of the molecular layer and Purkinje cell layer.

Bielschowsky's Staining for Neurofibrils: The molecular layer was reduced in width. The cells in this layer, both those in the upper part and those in the deeper zone, were remarkably decreased. Tangential fibers showed also diminution and they took a wavy course. The Purkinje cells were markedly destroyed, and those remaining appeared smaller and poorly stained, though an epicellular and endocellular network existed. Dendrites were for the most part absent, so that the molecular layer appeared much lighter; basket fibers and cushion fibers were diminished. The granular layer also appeared paler on account of the scarcity of the small spheroidal ganglion cells. Remarkably swollen fibers, whose origin was hardly determined, were found both in the molecular and granular layers. They might be either basket fibers, afferent fibers or nerve prolongations of Cajal's cells of the granular layer.

Some of the axis cylinders were swollen (not far from the Purkinje cells) to a peculiar shape, — spindle, spheric, sac form or other shape. Neurofibrils in this swollen body appeared mostly homogeneous, taking diffusely silver stain. This latter finding is the same as that described and explained first by Cajal and later by Rossi, Marinesco⁷ and Schaffer.⁸ These authors found this peculiar local swelling of axis cylinders in some special diseases, and claimed that they were the result of a regenerative process of the axis cylinder, the continuity of which is disturbed. I have seen this peculiar swelling of the axis cylinder in several kinds of brain disease, and I am rather of the opinion that this is a kind of regenerative-degenerative process, seen in many kinds of diseases in which there is degeneration of the Purkinje cells. Accurate description and explanation of this change is not the purpose of this paper, but will be given in a later communication. The vessels appeared to be very much increased in number in all the cortex layers and in the white matter of the cerebellum.

Each capillary showed marked arteriofibrosis, probably more marked than in the cerebrum.

(d) Microscopic Examination of the Spinal Cord: Little of note was found with the exception of a slight degree of arteriosclerosis and fatty degeneration of the cells of the anterior horn.

THE AUTHOR'S CASE COMPARED WITH CASES IN LITERATURE.

The onset of the myxedema in this case is unknown. It appears to have begun ten years ago when the patient was operated on for broad ligament cysts. Since that time the patient had been slowly but progressively failing, both mentally and physically. Her memory had begun to fail, especially for recent events. She had had many attacks of vertigo, sometimes falling to the floor, and this condition had become much more conspicuous in the later stages of the disease; she could not stand in the Romberg position, her gait became unsteady, and she showed marked disturbances of co-ordination movements. The latter symptoms remind one of the cerebellar symptoms of the myxedematous patient, which has been reported by Soderbergh, though accurate examination for these symptoms was not made in the present case. In recent years she had become untidy and would wander about on the streets. At times she became depressed and threatened suicide. Cases like this have also been described by Pilcz and others. Later, before and after her admission to the hospital, she became very dull and stupid, sleeping all the time.

The physical symptoms were typical. There was edema over the whole body. Bald head, "clown-like" face, thick flabby tongue, poor condition of the teeth, deafness, hydrops of the serous cavities, cyanosis of the hands, diminished activity of the reflexes, arteriosclerosis, bradycardia, etc., all correspond to the typical case.

Gross anatomy showed an extremely atrophic thyroid gland, both sides equally small, and with no isthmus. In our first case in the Danvers State Hospital series, according to the description of Dr. Peabody, the thyroid consisted of two small, tough, fibrous masses not connected by any isthmus, lying one on either side of the cricoid cartilage and beginning trachea. On section it looked like pale fatty tissue with much connective tissue. The parathyroid in that case, as well as in the present case, could not be identified. Although the absence of the isthmus is not uncommon, it certainly is not typical. It makes me

doubt, therefore, whether there is any relationship between congenital malformation and this disease.

Necropsy revealed the o-ophorectomy of the right side and the appendicectomy. It is very interesting to have found the same condition in our former case about which the necropsy protocol says: "Appendix is absent. No tube and ovary on the right. The left tube is invisible in the mass of adhesions. The left ovary is small (residual), and there are thick fibrous adhesions between the ovary and the adjoining tissues and to the ileum." This fact, found both in our former and present cases, suggests to me a probable etiologic relationship between the pathologic condition of ovaries and the myxedema.

Microscopic examination revealed extreme atrophy of the thyroid gland replaced by fibrous tissue and infiltrated by lymphatic cells. The pituitary body was a little smaller than normal, contrary to the statements of authors such as Boyce and Beadles, Ponfick and Murray, who found enlargement of the pituitary body in this disease. Arteriosclerosis of remarkable degree was found in all vessels of the body and the brain. In our former case there was also marked arteriosclerosis throughout the aorta.

As for the brain, cerebellum and spinal cord, we found more or less remarkable pathologic changes differing from the description of some authors such as Hun, Prudden, West and Harely. But are these pathologic findings specific or characteristic of this disease? This is an important question.

Before answering this question, let us survey the nature of these pathologic changes. They can be divided into two groups, the one being more or less localized and the other general in character. The first group is expressed by localized degeneration in certain convolutions, degenerations around the sclerotic vessels of the superficial cortex layers, perivascular gliosis, perivascular and focal accumulation of fat corpuscle cells, destruction of myelin sheaths, proliferation of glia fibers in degenerated parts, irregular thickening of the pia mater and the surface glia layer, etc. Vessels of the pia mater and the superficial cortex layers showed more marked sclerosis than those in deeper layers. The same condition obtained in the arteriofibrosis of small vessels. This group of changes, however, is nothing but the arteriosclerotic alteration of the brain. The second group consists of universal changes, such as fatty degeneration with granular and heavy change (Nissl), cell sclerosis

with fatty degeneration, and the cell vacuoles associated with the edematous condition of the brain. Though the fatty degeneration and cell sclerosis are found in the arteriosclerotic nature of the alteration, they are not universally distributed over the whole of the brain. According to Simchowicz, "Pathologically arteriosclerotic alteration is focal in character, whereas senile changes show diffuse distribution." So the second group of changes is different from those of an arteriosclerotic nature and resembles more the normal senile alteration.

We have, then, a case showing the combination of arteriosclerosis and senile changes. Now the question is: Are these arteriosclerotic alterations with senile changes due to the myxedema, or are they independent of it? The patient was sixty-six years old, and it is quite possible to show arteriosclerotic alterations and even senile changes without any disturbance of the internal secretion. But one thing should be mentioned — the fatty degeneration of the ganglion cells is too great for the normal senile changes at this age, and that makes the question much more complicated.

It is, however, a common occurrence in senility for the thyroid to become atrophic and undergo diffuse sclerosis, destroying the gland tissue. Horsley declares that old age is only a form of mitigated hypothyroidism, and that the people who enjoy a green old age owe this happy condition to a thyroid which has remained normal. "The points of resemblance," says Grotti,⁹ "between senility and a slight degree of hypothyroidism are more than one. Falling out of the hair, deafness, falling of the teeth, dryness of the skin, arteriosclerosis, bradycardia, diminution of the function of the nervous system and other symptoms which occur both in old people and hypothyroidism, can all be attributed to the atrophic condition of the thyroid gland." If this hypothesis is true, the question is very much simplified. For the increased arteriosclerosis and senile changes are nothing but the manifestation of the diminished function of the thyroid gland, and the pathologic findings which have been observed can safely be attributed to the hypothyroidism.

Schnitzler¹⁰ described a case of a thirty-two-year-old female, who had shown marked clinical symptoms of myxedema and mental symptoms of apathy and stupor and somnolence. He grouped his case with the type of which Spielmeyer wrote as "causes of senile dementia which differ from the usual type in that the marked dementia rapidly ensues, together with focal symptoms of asymbolic and aphasic character." He shows,

however, as Fuller expressed it, an inclination to flirt with the rather fascinating idea of an origin from disordered internal secretions, since his case and one of the cases reported by Perusini exhibited certain myxedematous symptoms. "Although," Schnitzler says, "the thyroid gland could not be examined post mortem, since the patient became very much better under the administration of thyroid preparation, it is quite possible that we dealt with a thyrogeneous disease. So we have a case showing a possibility of an intimate relationship between internal secretion and senile degeneration. If the normal senile degeneration is merely a consequence of hypofunction of the thyroid gland, can this condition of senile changes in our case not be attributed to the complication of the myxedema?" It seems to me rather unnatural to have classed his case as senile dementia. I see no reason why it should not be grouped with the myxedematous psychoses. In his case he has found no senile plaques; he has observed Alzheimer's neurofibrillar change, but this is not at all pathognomonic of senile dementia or of other senile conditions. Goto¹¹ found typical Alzheimer's¹² change in feeble-minded subjects, and even in dementia præcox. I was unable to find any of these changes in any parts of the brain in this case.

Further, if we look over the mental symptoms, such as loss of memory, especially for recent events, disturbance of the attention, suspiciousness, acute dementia, etc., which are always found in senile cases as well as in this case, we cannot believe that the anatomic substrata of this disease are dependent on anything else than the senile changes in a broad sense; *i.e.*, arteriosclerotic alterations, normal senile alterations and characteristic degeneration of senile dementia.

As for the cell change associated with the edematous condition, though it has, of course, nothing to do with senility, it must be considered as pathognomonic, since the edematous condition itself is the partial manifestation of the general symptoms of this disease.

The cerebellum was found more intensively degenerated than the cerebrum. The Purkinje cells diminished in number, those remaining showing marked degeneration. The fatty degeneration of the Purkinje cells, however, was not so marked as of the ganglion cells of the brain and the spinal cord which shows merely that the Purkinje cells are so-called lipophobic cells and nearly always escape fatty degeneration.

How far the cerebellar symptoms of reported cases and of

the present case can be attributed to the pathologic anatomic conditions of the cerebellum is hard to answer, but it is quite probable that they have played more or less of a part in the existence of such marked symptoms.

SUMMARY.

1. The writer presents a case of typical myxedematous psychosis which showed, together with known symptoms, marked disturbance of co-ordination, vertigo and somnolence.

2. The thyroid gland was found extremely atrophic with the gland tissue replaced by connective tissue fibers and with no isthmus. The remaining gland tissue was infiltrated by lymphatic cells. The writer suspects some etiologic relationship between the congenital factor and this disease.

3. The pituitary body was smaller than normal, though microscopically there was no evidence of atrophy.

4. The right ovary was removed ten years ago, the left remained atrophic, showing an evidence of chronic inflammatory process.

5. The writer suspects, having seen a similar condition of ovaries in a former case of the Danvers State Hospital series, some etiologic factors in certain diseased conditions of the ovaries.

6. The pathologic changes in the brain and the cerebellum consist of arteriosclerotic alterations, general senile changes and cell change associated with the edematous condition.

7. The writer attributes the arteriosclerotic alterations and the general senile changes to the effect of the myxedematous disease.

8. The cell change associated with the edematous condition is considered as pathognomonic.

The writer believes also that there is a possible correlation between the marked atrophy of the cerebellum and the clinical symptoms of disturbed co-ordination and of vertigo.

NOTE. — The writer is indebted to the staff of the Danvers State Hospital, especially to Drs. Macdonald, Bryan and Stevenson, for completing this report. He is also indebted to Drs. Southard and Canavan for their encouragement and advice in his study. To all of these he wishes to express his appreciation.

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ATYPICAL FORM OF ARTERIOSCLEROTIC PSYCHOSIS. A REPORT OF A CASE.*

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In recent years a number of atypical forms of arteriosclerotic brain disease have been reported. In addition to hemorrhagic areas and softenings caused by sclerotic arteries, there are several different forms of pathological changes due to a sclerotic condition of the cerebral arteries. The clinical symptoms differ considerably from the typical forms and at times make a correct diagnosis almost impossible. There have been a number of these cases reported by various observers. Jacobson reported a case of arteriosclerosis which showed bulbar symptoms, and Alzheimer described perivascular gliosis, claiming it to be the result of the arteriosclerosis. Buchholz found wedge-formed arteriosclerotic degeneration of the cortex. The encephalitis corticalis of Binswanger and the vacuole formation in subcortical white matter as described by Buchholz are also of arteriosclerotic origin. Rossbach described another peculiar alteration in the cortex of the brain due to arteriosclerosis, to which he gave the name, "état vermoulu Pierre Maries." Schob reported similar pathological changes which clinically showed paralytic symptoms. Still later Alzheimer reported a pathological condition of the cortex of the brain showing a spongy degeneration due to arteriosclerosis, but which could not be diagnosed clinically. He named this form of arteriosclerosis "*atypical*," to distinguish it from the typical, just as Lissauer's paralysis is called atypical to distinguish it from the typical form.

But how can this number of different forms be explained? The alterations are no doubt due to the sclerosis of the cerebral arteries. But the different locations, the different grades of sclerosis and perhaps the different durations of the disease, probably explain the various changes. When, for instance, pial vessels show a greater involvement than other vessels it may cause the anatomical picture of "état vermoulu of Pierre Maries;"

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when, on the other hand, superficial vessels of the cortex are more attacked, it may result in the formation of the wedge-shaped degeneration of Buchholz or the spongy degeneration as reported by Alzheimer. Encephalitis subcorticalis of Binswanger, and the vacuole formation in the subcortical region described by Buchholz, may also be the effect of arteriosclerosis of the medullary vessels. In the same manner the involvement of the different stems of the brain arteries may cause different clinical symptoms; for instance, sclerosis of the basilar artery showing the bulbar symptoms as reported by Jacobson. Sclerosis of the anterior and middle cerebral arteries showing the paralytic symptoms as reported by Schob and Alzheimer, changes in the cerebellar arteries showing the cerebellar symptoms, etc.

The following is a report of a case which was clinically diagnosed "probably brain tumor," but pathologically showed an atypical form of arteriosclerotic degeneration.

CLINICAL OBSERVATIONS.

Family History.—Mother died at the age of sixty-eight; cause of death unknown. Father died of stomach trouble. Two sisters died during childhood, one of intestinal trouble and the other of diphtheria. Another sister died of pulmonary tuberculosis at the age of twenty-four. One brother died of pulmonary tuberculosis at the age of twenty. Three brothers and one sister living and well.

Personal History.—Early development normal. Patient attended the public school and graduated from the grammar school. At the age of eighteen she came to the United States from Canada and entered the employ of the General Electric Company. She later worked in a shoe factory. At the age of twenty-one she married and her life was uneventful until the onset of her present condition. No history of venereal disease. At the age of forty the patient began to have difficulty in doing her work as well as she formerly did. She also complained of headaches, which were very constant and gradually became more severe. A year before her admission to the hospital she showed considerable memory loss. Following the death of her mother, which occurred about the same time as the loss of memory, her mental condition became much worse. She became more forgetful and kept repeating, "Oh, I wish Ma was alive." She gradually grew worse, and when spoken to repeated this sentence many times. Her memory became still more impaired for both recent and remote events. Later she began to walk with a great deal of difficulty, and finally became bedridden, not being able to stand. Occasionally she was untidy. A tremor of the hands developed, and it was necessary to feed, dress and care for her. She was admitted to this hospital Oct. 5, 1918.

Physical Examination.—General Appearance: Patient was a very well-nourished individual. Complexion was very muddy and colorless.

Muscles were very well developed but of poor tone. Skin, moist. No jaundice. There was a mottled condition of the arms, back, legs and feet. No bruise marks. No syphilitic evidences.

Thoracic, Respiratory and Circulatory Organs: Chest, broad and well developed. Respirations, 18 per minute. Lungs negative on percussion and auscultation. Heart: Apex beat was palpable in the fifth interspace about an inch to the left of the mid-clavicular line. Radial pulse was very poor quality, at times irregular. There was no sclerosis of the peripheral arteries. Blood pressure, 160-80.

Digestive and Abdominal Organs: There was considerable fetor oris. Tongue coated. Abdomen large but showed nothing on palpation. Liver and spleen were not palpable. Digestion, good. Bowel movements, normal.

Genito-urinary Organs: Negative.

Urine: Negative.

Wassermann: 10-12-'18. Reaction in blood serum negative.

Spinal Fluid: 10-9-'18. Wassermann reaction negative. Globulin slight ring. Albumin 2 in 20. Cells, 96. Gold, 1233421000.

Nervous System. — General Sensations: Patient had a feeling of exhaustion; was unable to express herself very clearly.

Eyes: Expression dull, listless. No nystagmus present. Pupils irregular and unequal, the right being widely dilated. They reacted very slowly to light and not at all to accommodation. Ophthalmoscopic examination was very unsatisfactory on account of the patient's inability to co-operate, but so far as could be ascertained the fundi were normal.

Ears: No discharge. Hearing good.

Taste and Smell: Test could not be performed, as the patient would not co-operate.

Cutaneous Sensibility: Tactile appreciation was slightly impaired, although it was rather difficult to say whether she realized when she was touched by a pin or a pencil. She was unable to localize readily for touch or space. Responded to pin pricks by wincing.

Deep Sensibility: There was no sensibility over the nerve trunks.

Stereognostic Sense: Patient was unable to tell the objects which were put in her hands with her eyes closed.

Vasomotor Conditions: Dermographia was present and there was much mottling of the skin of the arms, shoulders, legs and feet.

Reflexes: Knee jerks were exaggerated. Ankle clonus was present on the right side but not present on the left. No Babinski. Gordon and Oppenheim not present.

Involuntary movements: There was a marked tremor of the hands, tongue and lips.

Sleep: Patient was somewhat restless in the hospital, but as a rule slept fairly well.

Mental Examination. — Patient was in bed during her entire residence in the hospital. She was very restless, frequently pulled out handfuls of her hair, gathered up the bedclothing and threw them off, and picked at

her face. All motions were meaningless and performed with considerable effort. Her movements were slow, deliberate and lacked co-ordination.

Speech: Patient's speech was retarded, slurring and at times showed elision of whole syllables.

Consciousness and Orientation: Patient was not oriented for persons, place or time. She did not realize where she was, nor recognize any one about her.

School Knowledge: It was impossible to gain any knowledge from the patient. Could not give the names of the New England States and could not give any information about her school work whatever.

Calculation Ability: Could not be tested.

Handwriting: Could not be tested, her hand shook so badly.

Hallucinations: Apparently she did not react to any hallucinations.

Memory: There was marked memory loss. She was unable to recall recent events, did not know how long she had been here nor where she came from. She was unable to state even a few facts concerning her remote past. She usually answered by repeating the questions that were asked her.

Association of Ideas: There was marked retardation and looseness of thought connection. Her attention wanders so that it is almost impossible for her to concentrate for over an instant.

Judgment and Conclusion: There was no apparent delusion formation, although at times she seemed a little apprehensive and suspicious, attempting to strike the examiner when approached. Had no insight whatever.

Emotions: Patient showed no increased emotional excitability. At times she was somewhat irritable, but was usually dull, seclusive and listless.

Social Relations: Patient was untidy. At times aggressive, scratching the nurse and pulling her hair. It was necessary to spoon-feed her, as she was unable to help herself in any way.

Course of the Disease. — Oct. 8, 1918. Untidy. Helpless.

Patient remained in bed unable to help herself in any way. Plaited the bedclothes or picked or pulled at her teeth and hair. Had no grasp on her surroundings, and did not appear to comprehend what was said to her. Conversation was a repetition of what she heard. When an attempt was made to induce patient to stand, her legs could not support her and she would have sunk to the floor if not assisted. Was spoon-fed and seemed to have a very good appetite.

Oct. 15, 1919. Weak. Unable to articulate distinctly. Untidy.

Last night about 9 o'clock patient had an attack of syncope. Seemed very weak, dripping with perspiration; pulse feeble, rapid and irregular, 150 per minute. There was visible pulsation of vessels of neck. Was given a stimulant and revived, but since then she seemed dazed and practically inaccessible. Lay on her back with her mouth open, right leg drawn up. The mottling of the skin on the right foot was much more pronounced. She would not straighten her leg out, and when attempts were made to do so for her she resisted and cried out. When questioned

she kept repeating what was said to her, seldom giving an intelligent reply. Was constipated. Very untidy. Had a very good appetite.

Oct. 20, 1918. Died to-day.

Patient has been unconscious for the past twenty-four hours and died to-day at 12.30 P.M. Cause of death was given as organic brain disease.

POST-MORTEM OBSERVATIONS.

The autopsy was performed ten hours after death by Dr. Canavan and Dr. Uyematsu. The anatomical diagnoses were as follows: Beginning gangrene of fingers and toes; claw-like position of hands, especially the right; sclerosis of coronaries; beginning sclerosis of aorta; cirrhosis of liver; chronic diffuse nephritis; fatty replacement of pancreas; submucous hemorrhage of stomach; chronic perio-phoritis; a small fibroid in uterus; bony elevations of inner table of the calvarium; chronic pachymeningitis; chronic leptomeningitis; external hydrocephalus; universal atrophy of the convolutions (first and second convolutions of temporal lobes, orbital portion of frontal lobes and pyriform lobes are relatively in good condition); brain sclerotic; brain weight, 970 grams.

Macroscopical observation of the Calvarium and Brain. — Calvarium was rather thin with no diploë. Measurements: F. 0.4 — T. 0.3 — O. 0.6 cm. Inner table showed small bony elevations. Grooves for middle meningeal arteries were shallow. Base of skull showed nothing notable.

Brain weighed 970 grams. Dura mater was thickened and particularly adherent over the frontal region. By pleating back the dura mater, the pia mater could be seen lifted from the cortex by a marked quantity of clear fluid; 5 c.c. could be easily collected between any two convolutions. Pia mater was slightly opaque over the vertex and congested, especially over the occipital lobes. The atrophy was very marked over the vertex, involving the posterior part of the frontal, entire parietal and occipital lobes. The anterior inferior cerebellar artery on the right side was missing. The vertebral arteries, basilar artery, internal carotid arteries and major arteries of the cerebrum and cerebellum were all very markedly sclerotic. There was marked excess of cerebrospinal fluid at the base as well as the vertex of the brain. Cranial nerves were negative.

Spinal Cord. — The dura mater was slightly thickened. There was an excess of cerebrospinal fluid. Otherwise nothing of note.

The brain was put into a 10 per cent solution of formalin for fixing. The following is the description after two weeks' hardening: The pia mater stripped easily, except over occipital lobes, where it was firmly adherent to the cortex; the vessels were markedly congested. The convolutions of both hemispheres were extremely atrophic, as may be seen by pictures. It is well to note that the atrophy of both hemispheres is almost symmetrical. The atrophic convolutions over both hemispheres were as follows: —

Right.

Anterior central.
 Posterior central.
 Posterior one third of superior frontal.
 Middle frontal.
 Inferior frontal.
 Superior parietal lobule, *Softening*.
 Inferior parietal.
 Posterior portion of supramarginal gyrus.
 Angular gyrus.
 Inferior temporal.
 Occipital convolutions.
 Paracentral lobule.
 Precuneus.
 Cuneus.
 Isthmic part of gyrus fornicatus.
 Lingual gyrus.
 Fusiform gyrus.
 Posterior part of hippocampal gyrus.

Left.

Anterior central.
 Posterior central.
 Posterior one third of superior frontal.
 Middle frontal.
 Inferior frontal except the opercular portion.
 Superior parietal lobule.
 Inferior parietal.
 Anterior portion of the supramarginal gyrus.
 Angular gyrus.
 Posterior part of middle temporal.
 Inferior temporal.
 Occipital convolutions.
 Paracentral lobule.
 Precuneus.
 Cuneus.
 Posterior one third of gyrus fornicatus.
 Lingual gyrus.
 Fusiform gyrus.
 Posterior part of hippocampal gyrus.

The only portions of the brain that did not show this curious atrophy were the orbital portions of the frontal lobes, the anterior part of superior frontal convolutions, the anterior part of gyrus fornicatus, superior and middle temporal convolutions, opercular portion of the left hemisphere, the convolutions of the island of Reil and both uncii. At the points of the greatest atrophy in the cortex there was a process showing a moth-eaten appearance and some speculation as to the causation of this widespread atrophy might be interesting.

Those who are well acquainted with the anatomy of the cerebral arteries will know how closely the healthy portions of the brain are related to certain regions of arterial blood supply. The anterior part of the superior frontal convolution, a larger part of gyrus fornicatus, a part of paracentralis and precuneus, gyrus rectus and the bulbus and the tractus olfactorius remained relatively healthy in this case. These portions of the brain are a zone nourished by the anterior cerebral artery. This artery suffered much less from the pathological processes than the other large arteries, *i.e.*, the middle cerebral and the posterior cerebral arteries. The other healthy portions of the cortex were all located in the course of the middle cerebral. Each healthy portion was closely associated to certain branches of this artery. The uncus and the island are nourished by special arterial branches, according to Duret. The superior and middle temporal convolutions are supplied by the fourth branch of the middle cerebral artery. Though the opercular portion and the supramarginal convolution belong to regions of other branches, they are all in the neighborhood of the above-mentioned healthy parts, and this condition can readily be understood by an assumption of anastomosis.

Although the atrophy of the convolutions seems to correspond to certain

regions of arterial supply, the alteration of the brain is so peculiar that at first it was difficult to associate the disease with an arteriosclerotic process.

Vertical sections of the brain were made according to Dalton's method.

The cut surfaces showed atrophy of the cortex corresponding to the atrophic convolutions. In the highly atrophic parts the surface of the cortex presented a moth-eaten appearance. The width of the cortex over the atrophic parts was noticeably narrow. Where the atrophy was pronounced the markings of the cortex and the medulla had entirely disappeared. The lateral ventricles were somewhat dilated. The centrum semiovale seemed to be atrophied on both sides, and was smaller than normal, so that the entire cut surface of the vertex appeared strikingly smaller than that of the basilar portion. The corpus callosum seemed almost thinner than normal.

In the left hemisphere there was an old hemorrhage, occupying the head of the striate nucleus, internal capsule, globus pallidus and putamen, extending from the cut surface "through the corpus callosum and lenticular nuclei, and in front of the anterior commissure" (Dalton's ventral section, Plate VI) to the cut surface "through the corpus callosum, optic thalamus and crura cerebri" (Dalton's ventral section, Plate X). This hemorrhage destroyed the knee and the larger part of the crus posterior of the internal capsule which is supplied by the lenticulo-striate artery. This artery is considered to be the most common seat of arteriohemorrhage in the brain. There was no history of cerebral hemorrhage in this case. However, her inability to walk, the exaggerated knee reflex, the ankle clonus of the right side and the claw-like position of the hands indicate a hemorrhage previous to the admission.

The cut surface of the parietal and occipital lobes shows congestion of the vessels both in the gray and the white matter. There were also tiny hemorrhagic areas in the white matter around the posterior horn of the lateral ventricles.

Where the atrophy of the parietal convolutions was most marked there were areas of softening.

The systematic atrophy of the convolutions, the hemorrhage and the softenings point to arteriosclerotic brain disease. The question is, is this curious atrophy so extreme in character, so universal in distention, due to arteriosclerosis only, or are there other diseases which show such atrophy? Wassermann reaction being negative both in the blood and spinal fluid, these changes do not correspond to general paralysis. The patient was forty-eight years old at the onset of the disease, and it could hardly be a senile atrophy.

MICROSCOPICAL EXAMINATION.

The Cerebrum.—Sections derived from several convolutions of both hemispheres were stained by thionin, Bielschowski's method of silver impregnation, Mallory's glia method, Weigert Pal's modification for myelin-sheath staining, Sudan III, Marchi method, hematoxylin-eosin staining,

Van Gieson's method and Dabrowski's modification of Mann's method for demonstrating perivascular connective tissue. Although the cornu ammonis, Heschl's transverse convolution and anterior part of frontal convolution appeared relatively healthy, the atrophic parts showed a peculiar process of degeneration.

This peculiar process of degeneration, although appearing in various forms of alteration, seemed to be related to the diseased vessels. The pia mater was irregularly thickened over the posterior part of the brain, and over the cerebellum it was adherent to the cortex by brush-like glia fibers which arose from the surface of the cortex where the glia fibers were thickly interwoven. The vessels of the pia mater were sclerotic, partly calcified and partly degenerated. Fat corpuscle cells were seen around these vessels.

In atrophic parts the surface glia layer was remarkably thickened. Spider cells with large protoplasmatic body and thick fibers were numerous. The body of these spider cells contained fat corpuscles which stained both by the Sudan and Marchi methods.

The degeneration of the cortex was not uniform but varied in its appearance. It could be divided roughly into four forms.

1. *Cystic Degeneration of the Cortex.* — There were a large number of small cystic areas immediately under the glial surface. Most of them were triangular or wedge-shaped, while others were quadrangular or irregular, but in all cases the base or the broader part of the cyst was against the surface. The smaller number of these cystic areas were, however, situated in the deeper part of the cortex, generally under the valley between two convolutions. These cysts were surrounded by a luxuriant growth of glia cells and glia fibers. The inside of the cyst was not of empty space but was occupied by net-like structure. This structure was made of capillaries, perivascular connective tissue, glia fibers and a small number of cellular elements. The cells were glia cells and fat corpuscle cells, the protoplasm of which contained waste products which were stained brownish red by Sudan, a muddy color by the Marchi method and metachromatic by methylene blue. The cysts were under the glial surface which was densely interwoven by newly formed, thick fibers, but in certain parts of the cortex was connected with the subarachnoidal space. This latter condition is the same as described by Pierre Marie as "état vermoulu," and reported as such by Rossbach in a case of arteriosclerosis. The cystic cavity with net formation corresponds to the second stage of the "spongioeser Rindenschwund" which was described by Fischer. But in his case the areas of spongy degeneration were situated mostly corresponding to certain cell layers of the cortex, and were not absolutely associated with the sclerotic vessels. In the present case vessels of the pia mater and those of the inside and the direct neighborhood of the cysts show marked sclerosis and arteriofibrosis. The characteristic localization and specific form of the cysts in this case are also different from Fischer's "spongioeser Rindenschwund." But as the "spongioeser Rindenschwund" is the name given to a certain appearance of the degen-

eration, and is not the name of a specific disease, there is no reason why this term should not apply in the present case.

2. *Packet Formation of the Vessels.*—Accompanying the arteriosclerosis of the larger vessels of the brain, the microscopic examination showed a remarkable alteration in the smaller vessels of the cortex, such as proliferative elements, fatty degeneration of the adventitia, splitting of the elastica and arteriofibrosis of Friedmann. These smaller vessels showed here and there packet formation, usually in the upper part of the cortex and including the first, second and third layers of Brodmann, but rarely extending down to the white matter. The surface of the cortex over these areas was sunken below the normal level, as was the case of the cyst formation. In the focus of the packet formation the nerve cells and myelin sheath have entirely disappeared, and instead of these the place is occupied by proliferated larger and smaller vessels with connective tissue elements which consisted of glia fibers and perivascular connective tissue fibers. This kind of change is not described in the cases of Rossbach and Schob or Fischer. The packet formation could hardly be seen, due to the relative increase of the vessels in consequence of the atrophy of the nerve elements.

3. *Scar Tissue Formation.*—This variety of alteration was also found in the cortex where the surface was sunken below the normal level. The form of the scar tissue was usually wedge-shaped and was situated principally in the upper layers of the cortex and perpendicularly to the surface. But some of these were further down in the cortex or even in the white matter, but were always situated according to the course of the vessels. The scar tissue was formed by increased vessels, glia cells and fibers. The glia cells were spider cells having large protoplasmic bodies and thick fibers. The protoplasmic bodies contained waste products. The thick fibers of the glia formed a network which was denser around the vessels than any other parts and gave a characteristic spongy appearance. This condition corresponds exactly to the third stage of Fischer's "spongioeser Rindenschwund." This scar tissue was found side by side with cystic areas suggesting the same etiological factor. Yet the former seems to take place where the wasting of the brain matter is not complete enough to allow regeneration of the glia tissue.

4. *Changes Pertaining to Ganglion Cells.*—Excepting the general changes of the ganglion cells which consisted mostly in sclerosis and granular changes, there were small circumscribed areas where the ganglion cells had entirely disappeared. By thionin staining this condition was plainly observed. The cells about these areas showed marked fatty degeneration combined with sclerotic changes. Fat corpuscle cells and increased numbers of glia cells were seen inside and around the focus. The ganglion cells of the healthy parts were relatively in good condition, so at Heschl's transverse convolution, cornu ammonis and orbital part and anterior part of the superior frontal convolution. Betz's cells had partly disappeared and partly remained with more or less marked degeneration.

The posterior central convolutions and parietal convolutions were most heavily damaged.

The myelin sheath showed a secondary degeneration running from the degenerated parts down to the white matter, and also perivascular degeneration according to the course of the long medullary vessels. There was perivascular gliosis in the white matter as well as in the cortex, but there was no perivascular infiltration of lymphocytes or plasma cells as is the case in a chronic inflammatory process.

The Cerebellum. — Pieces were taken from several parts of the worm and hemispheres and examined by the same staining methods as for the cerebrum. The lamellæ of the lobulus quadrangularis and superior lobulus seminularis were found most atrophied. Alterations in the cerebellum differed a great deal in appearance. The most marked and extreme one was the cyst formation. These cysts were located principally in the molecular layer, but also in the granular layer and in the medulla. They were not particularly wedge-shaped but rather of irregular form, and were found usually in the summit of the lamellæ. The inside of the cysts were not empty but showed a very peculiar appearance. Where the cysts lay in the molecular layer the nerve elements were entirely gone, and the remains of Bergmann's fibers running across the molecular layer reaching the thickened glial surface gave a remarkable resemblance to a slat fence. When the cysts were in the granular layer they formed a loose network of glia fibers with very few cellular elements. They had the same appearance as the cysts in the cerebrum. The glia fibers around these cysts were thinner and denser than those in the cerebrum, and the cell elements in the glial wall were not as numerous as in the cerebrum. The cell body contained fewer waste products. These conditions indicate that the degeneration of the cerebellum had taken place probably more or less earlier than in the cerebrum.

The next remarkable change was the scar-formation which was, however, somewhat different from that of the cerebrum. The molecular layer, where the scar was formed, was very much narrower than the healthy part, and showed no more nerve elements, such as tangential fibers, basket fibers, basket cells and dendrites of Purkinje cells. The glia fibers grew densely in this place in the form of Bergmann's fibers, *i.e.*, running in parallel order, perpendicularly to the surface and further into the pia mater in the form of a brush. The scar formation in the granular layer and medulla was practically the same as found in the cerebrum except that the glia fibers were thinner and more densely interwoven.

The third kind of alteration was the disappearance of the cell element, especially Purkinje cells and the small round ganglion cells of the granular layer. In the highly degenerated parts no Purkinje cells were observed. The degeneration of the ganglion cells of the granular layer was found focally, as is seen by illustration.

The smaller vessels of the cortex were as sclerotic as those of the cerebrum. In general, the Purkinje cells were more or less sclerotic; the cell

body was emaciated; the endocellular and epicellular network was not well defined; by thionin staining the protoplasm and nucleus stained dark showed no Nissl's bodies; dendrites had for the greater part disappeared. The axis cylinder of Purkinje cells was thickened; in certain parts, mostly in the neighborhood of the cyst formation or scar formation, the peculiar swelling of the axon was observed. Fatty degeneration of the Purkinje cell was not marked, except in those near the degenerated focus. Fat corpuscles were found around the thickened vessels in the Purkinje cell layer and around the area of disappearance of the nerve elements.

Spinal Cord. — By myelin-sheath staining, the left anterior pyramidal tract and the left lateral pyramidal tract were stained considerably paler than in any other places. The glia fibers seemed to be increased in these areas, but no lipid matter, either by Sudan III or by the Marchi method, could be demonstrated. The secondary change resulting from cerebral hemorrhage should therefore be considered fairly old, as the lipid matter had been completely resolved and had permitted the glia tissue to grow in its place. Abundant amyloid corpuscles were found about the posterior root and in the degenerated pyramidal tracts.

COMMENT.

The patient began to fail seven or eight years ago, and could not do her work as well as she formerly did. She complained of constant headache, which gradually became more severe, especially during the past year. At this time her mental condition became much worse; memory was very much impaired; she became demented, disoriented, showed stereotyped conversation and echolalia. Physical examination revealed irregular, unequal pupils, which reacted very slowly to light, and not at all to accommodation. She also showed exaggerated knee jerks, ankle clonus of the right side, tremor of the hands, tongue and lips, impaired stereognostic sense and disturbance of tactile appreciation. Her speech was retarded, slurring and at times showed elision of whole syllables. Although there is no history of any dizzy spells or hemorrhage, she has been unable to walk for the past year, and at the time of her admission she was not even able to stand. The hands, especially the right, showed a claw-like contraction, and there was beginning gangrene of the fingers and toes at the time of her death.

The whole history, physical and mental examination show, therefore, much likeness to general paralysis with focal symptoms, *i.e.*, the Lissauer's paralysis. But the course of the disease is perhaps a little too long for the general paralysis, and the negative Wassermann of blood and spinal fluid are also against

the presumption of this diagnosis. So the case was left undiagnosed, being probably a case of cerebral tumor because of the constantly increasing headache and more or less conspicuous focal symptoms.

Autopsy showed sclerosis of the coronary vessels, beginning sclerosis of the aorta, cirrhosis of the liver, chronic perio-phoritis, chronic diffuse nephritis, etc. The brain was found extremely atrophic, and at the point of greatest atrophy there was evident a process resembling moth-eaten result in the cortex. A careful examination indicated that the atrophy of the convolutions was intimately related to the sclerotic brain arteries which occurred mostly in the basilar, posterior and middle cerebral arteries. In addition to small areas of softening there was an old hemorrhage occupying the internal capsule of the left side. So this curious atrophy of the brain seemed to be related to arteriosclerosis of cerebral vessels.

The microscopical examination showed arteriosclerosis, especially of small vessels of cortex, such as proliferative changes in endothelium, regressive processes in proliferated elements, fatty degeneration of adventitia, splitting of elastica and marked arteriofibrosis. The degenerative process of the cortex which seems to be a result of arteriosclerosis was exactly the same as described by Fischer as "spongioser Rindenschwund." He observed this special alteration of the brain, most commonly in general paralysis and less so in senile dementia, tabes and pre-senile psychosis. He assumed it to be an independent specific disease due to some unknown toxic agent. He divided this alteration into three different stages, — first, disappearance of the ganglion cells in circumscribed areas; second, loosening of the tissue of these areas; and third, growth of the glia fibers in the loosened tissue. He took also great pains to explain that this kind of alteration has nothing to do with the sclerotic vessels. But the "spongioser Rindenschwund" is the name given to a certain appearance of the degeneration, and not to etiological factors or symptoms of the disease, so that we could reasonably apply this term in the present case. In fact, Alzheimer reported a peculiar degeneration of the brain due to arteriosclerosis and in which the histological findings were described as "spongioser Rindenschwund."

In the present case the alteration is divided into four different forms. I do not mean that they are different stages of one and the same process, as were explained by Fischer, although they are found side by side in the same convolution. They must, at

least in this case, depend upon the occlusion of the vessels. If this occlusion is sudden and complete, a cystic cavity may be formed, showing a reactive growth of neuroglia on its peripheral portion. If, on the other hand, the occluding is slow and progressive, it might show various stages of reactive growth of neuroglia and removing process of the wasted products, according to the grades of the destruction. In the same way the budding of the vessels or the packet formation in the different parts of the same convolution might be explained.

The brain alteration due to arteriosclerosis, as was already mentioned in the introduction, may have occurred in various ways, but the spongy degeneration of the cortex is one of the rarest findings of this nature. So far as I have been able to find, the case of Schob (1911) and the case of Alzheimer (1913) have been the only two which have been reported as such. The former was not described as spongy degeneration, but the findings are almost exactly the same as Alzheimer's, and this case should readily be classified into this form. Strictly speaking, his case showed also the condition which was called by Pierre Marie "*état vermoulu*," and was described as such in a case of arteriosclerotic brain degeneration by Rossbach. "*État vermoulu*" and "*spongioser Rindenschwund*" due to arteriosclerosis are considered as the same process, the former involving the surface of the cortex, the latter, the somewhat deeper part, *i.e.*, beneath the glial surface.

The clinical symptoms of the two reported cases were similar to the present case, that is, general paralysis with more or less apparent focal symptoms. In Schob's case the patient was twenty-six years of age at the onset of the disease, and showed progressive dementia, marked disturbance of speech and handwriting, disturbance of gait and later epileptiform seizures. The patient died at the age of forty-one. In Alzheimer's case the patient was fifty-five years of age when he showed the first symptoms, which consisted of loss of memory, stereotyped conversation, disturbance of speech such as stumble of syllables and scanning speech, amnesic aphasia, handwriting with many paragraphs, retarded pupillary reaction, exaggerated knee reflex, etc. This patient died at the age of sixty. In both of these cases Wassermann's reaction in the blood serum was positive, while the reaction in the spinal fluid was negative. Schob's case was diagnosed as a demented form of general paralysis, while Alzheimer's case was diagnosed general paralysis or presenile de-

mentia. But in both of these cases the negative findings of the spinal fluid made the diagnosis very uncertain.

The question is: Why should the arteriosclerotic psychosis not have been considered in these cases as well as in the present one? Are there no characteristic symptoms which would lead one to suspect an arteriosclerotic process?

Let us first consider what symptoms may be attributed to arteriosclerosis. According to Alzheimer the onset of the disease is usually in the sixth decade. In the beginning there are headaches, dizziness, loss of memory, listlessness, irritability, and later, more and more increasing dementia, which requires a longer period of time to develop than in the case of general paralysis. Active symptoms of mental disturbances such as delusions and hallucinations are always transitory in character, and are not even frequent in this form. One of the most remarkable symptoms is the insight into the condition which is kept even in the later stages. Loss of accommodation to light, disturbances of speech, handwriting and gait, tremor of the hands, lips and tongue and other symptoms are described as less common.

In the present case the headaches in the beginning of the disease, which constantly became worse, loss of memory, gradually increasing dementia, listlessness and irritability are quite typical of cerebral arteriosclerosis. The relatively young age of the patient (forty years at the onset of the disease), stereotyped conversation, echolalia, disturbances of speech, slow reaction of pupils to the light, tremor of the hands, lips and tongue, impaired stereognostic sense, disturbance of tactile appreciation, etc., are rather unusual for arteriosclerosis, if not absolutely against it. Disturbance of gait especially with ankle clonus of one side and the claw-like position of the hand, especially of the right, would rather point more to hemorrhage than tumor. Insight was absent when she was admitted, and the history is not accurate enough to judge on this point, previous to her admission. The case is very similar to the two cases reported by Rossbach and Alzheimer.

But in this case and perhaps in Rossbach's case the relatively younger age of the patient and the normal blood pressure would account for the diagnosis being made without the consideration of arteriosclerosis. Sclerosis of the cerebral arteries, as is well known, is not always parallel with that of the peripheral arteries. Advanced arteriosclerotic changes may be present in the vessels of the brain when the condition is not marked in the radial ar-

teries. The gangrene of the fingers and toes must signify circulatory disturbance of the peripheral arteries. At the autopsy the coronaries showed sclerotic changes, the aorta very slight change, but all of these suggest only beginning arteriosclerosis. So it may be impossible to judge the condition of the cerebral arteries by the condition of those of the peripheral arteries or even by the blood pressure. This makes accurate diagnosis in arteriosclerotic condition of the cerebral arteries very difficult and at times impossible.

In the reported cases and in the present case the disease occurred at a relatively young age and lasted for many years, — Rossbach's case fifteen years, Alzheimer's case five years, and the present case seven to eight years.

The etiology of arteriosclerosis occurring in the cerebral arteries of relatively young persons is very obscure and cannot be explained. In the two reported cases the Wassermann reaction of the blood serum was positive, but the sclerotic changes of the arteries were quite different from those as a result of syphilis. The microscopical examination of the thyroid, ovaries and other organs of internal secretion, which are sometimes supposed to be the cause of the early occurrence of senility, showed nothing to account for the arteriosclerotic changes.

Finally we have to explain the correlation between the clinical symptoms and the anatomical findings. The reader may have already recognized the striking similarity of the process of destruction in this case and those already reported to that of general paralysis. The progressive and extreme wasting of the brain in this case must have given the same clinical features as in cases of general paralysis. The disturbance of the speech, the tremor of the hands, lips and tongue, the dementia, the diminution of tactile appreciation, can all be attributed to the extreme degeneration of the areas of the cortex, which are associated with these functions. The ankle clonus of the right side and the claw-like position of the right hand must be the effect of the hemorrhage in the knee and anterior two-thirds of the crus posterior of the internal capsule.

CONCLUSION.

1. The presented case is one which showed clinically paralytic symptoms, but with a negative Wassermann reaction both in the blood and spinal fluid.

2. Constantly increasing headaches and focal symptoms made one suspect brain tumor.

3. By autopsy the brain was found extremely atrophic, giving a moth-eaten appearance.

4. Major arteries of the brain were found markedly sclerotic.

5. The microscopic examination revealed a peculiar alteration of the cortex, which is called by Fischer "spongioeser Rindenschwund." (The writer attributes this peculiar alteration to the result of malnutrition caused by sclerotic brain arteries.)

6. An old hemorrhage was found in the left internal capsule, which also points to the arteriosclerotic nature of this peculiar atrophy.

7. The paralytic symptoms are believed to be the expression of the progressive and profound wasting of the cortex, which resembles the wasting process of general paralysis.

8. As for the etiology of the sclerosis of the brain arteries the writer is not able to give any satisfactory explanation.

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A CASE OF DIFFUSE CEREBROSPINAL SCLEROSIS.*

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INTRODUCTION.

Since Kelp (1871) and Schuele (1872) reported certain cases under the title *diffuse sclerosis* a great many have been described by different authors. Among these, Strümpell and Heubner were the first to describe the clinical symptoms and the anatomical findings more thoroughly than the preceding authors, and to give a certain definition to this disease. According to these authors, diffuse sclerosis is characterized by a rapidly progressing mental deterioration and a peculiar spastic condition of the muscles of the body. Anatomically an abnormal increase in consistency of the medullary substance as a result of proliferation of the interstitial tissue was noticed.

As to the etiology of this disease, the opinions of the different authors vary greatly. Most writers seem to believe that diffuse sclerosis is, in reality, the terminal stage of a number of different diseases. Some of them are probably of a syphilitic nature, while others are possibly in the advanced stage of disseminated sclerosis. The discussion as to the genesis of the pathological changes is not exhausted. It is to be decided, if these changes be exogenous or endogenous in character, and what relation exists, if any, between the changes on the nervous parenchyma and those of the interstitial connective tissue element.

Thus the etiology and the genesis of this condition is not settled in spite of the large amount of research on the subject.

The following is a case of diffuse sclerosis showing very unusual clinical manifestations and very peculiar pathological findings.

ABSTRACT OF CLINICAL OBSERVATIONS.

Preceding the mental disturbances, which occurred eighteen years before her death, the patient had a "shock," followed by eight weeks' aphasia. Upon recovering, there was no apparent speech defect. She limped somewhat. She was committed to the Worcester State Hospital when she was thirty-eight years of

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age, showing manic exhilaration. She stayed there seven years, during which time she manifested the alternating periods of excitement and depression. She was diagnosed as a typical case of manic-depressive insanity. She showed, however, some impairment of the memory and poor insight as to her condition even in time of remission. The patient escaped from the Worcester State Hospital and was admitted to this hospital when she was forty-eight years of age. When admitted she presented a slight asymmetry of the face and evidence of mitral regurgitation and hyperactive reflexes. The Wassermann test of the blood serum was positive. Mentally, she still showed alternating excitement and depression, and was considered to be a manic-depressive case. But in a number of years she became gradually demented. From her forty-sixth year she had a number of fainting spells with short periods of unconsciousness. She gradually weakened and became rather indifferent and apathetic. From this time she was considered to be tuberculous, and was cared for in that building, being in bed all the time. When about forty-nine years of age she was markedly demented, helpless and was suspected of general paralysis. The examination of the spinal fluid was negative. She failed progressively, both mentally and physically. She became disoriented and apathetic. She died in this condition, eighteen years after the onset of the mental disorder. In this manner the clinical condition of the patient swayed from typical manic depressive to a suspicion of general paralysis, dementia præcox and possible epilepsy.

POST-MORTEM OBSERVATION.

Autopsy twelve hours after the death. The anatomical diagnoses are as follows: Well developed and nourished (body length 156 cm., body weight 40 kg.); uterus sinistrotorted; high placing of the left tube and ovary; fibrous adhesive pleuritis of both sides; chronic vegetative endocarditis; congestion of the inferior lobe of the right lung; beginning sclerosis of the aorta; chronic diffuse nephritis; fibroid of the uterus; a small ovarian cyst; catarrhal cystitis; etc.

Description of the Brain. — The calvarium is thick and heavy. The grooves of the meningeal vessels are shallow. The dura is not thickened but is slightly adherent to the pia mater. There is some subpial edema and milkiess of the pia mater. The vessels over the entire brain are injected. The basilar artery is slightly sclerotic. The brain is remarkably small; weighs only 870 grams.

Pituitary Body and Spinal Cord. — Not remarkable.

The brain was carefully examined after two weeks' fixation in 10 per cent formalin. Both hemispheres are about the same size, measuring 15 cm. in length, 5.5 cm. in breadth, 6.5 cm. in height. The convolutions of the cerebrum do not appear atrophic, though they are apparently simpler than normal. In the middle part of the right, first frontal convolution, chiefly on the medial aspect, there is a cyst as large as the tip of the small finger. The wall of this cavity is smooth, white in color and not pigmented. The second frontal convolution at the junction to the anterior central convolution is very narrow and soft to the touch, indicating a softened area inside of this part. Otherwise, the brain is unusually firm in consistency and gives the feeling described as "lederartig."

Examination of the Cut Surface. — Beginning from the cyst of the right first frontal convolution and ending at the above-mentioned softened area of the right second frontal convolution, the larger part of the centrum semiovale of the right side is softened. This softening involves a part of the internal capsule, and on the cut surface through the precentral sulcus there is a small cyst in the internal capsule. The internal capsule and an adjacent part of the lenticular nucleus of the left side is also the seat of the softening, which appears somewhat brownish yellow in color.

Except in these softened areas the white substance of the brain feels uniformly firm. The ventricles are not dilated. The ependyma is not granulated.

Sections of the brain stem reveal some softening and small cysts in the pons on each side, between the pyramidal tracts and medial lemniscus.

MICROSCOPICAL FINDINGS.

The vessels of the pia mater show thickened walls and some regressive changes. Here and there a slight infiltration with lymphocytic cells is observed. No plasma cells are found even by careful examination with Unna-Pappenheim's method.

The changes pertaining to ganglion cells of the cortex and basilar nuclei are not remarkable. The cells around the cystic degeneration present very marked sclerotic changes (Nissl), combined with remarkable deposits of fatty, pigmented substance. Otherwise the parenchymatous involvement is not very conspicuous. The unusually small brain ought not to be considered as an atrophic condition due to the parenchymatous de-

generation of the brain. The small brain with apparently simpler convolutions would indicate hypoplasia rather than atrophy of the brain.

The most striking alterations are those of the myelin-sheaths and the glia cells. In the areas of the softening, mentioned above, the myelin-sheaths show marked, but not complete degeneration. The line of demarcation between normal and abnormal parts is not as sharp as in multiple or diffuse sclerosis as usually reported, but shows a gradual transition. Even in the center of the degenerated marrow, and in this respect differing from cases formerly reported, the myelin-sheaths have not entirely disappeared. The involved focus shows loosened myelin fibers and irregular degeneration. Some fibers are thin with light staining, while others are thick, showing irregular swelling and poor staining qualities. This kind of degeneration is found, not only in the softened areas of the right hemisphere, but in the whole extension of the right centrum semiovale, in the greater part of the left centrum semiovale, the internal capsule and the adjacent part of the left lenticular nucleus. In the direct neighborhood of the cysts both myelin fibers and axis cylinders have entirely disappeared. The degeneration of the myelin-sheaths appears to have occurred hand in hand with that of the axis cylinders, and in this respect it differs from the cases of Schilder and others.

By Weigert-Pal's staining the pyramidal tracts, both in brain stem and spinal cord, appear somewhat paler than other parts, suggesting possible secondary degeneration.

The most important pathological findings in this case, as the title of this paper indicates, consist in the changes found in the sustaining tissue. The glia cells are enormously increased both in the gray and in white matter of the whole central nervous system, *i.e.*, brain, brain stem, cerebellum and spinal cord. These cells are not only increased in number, but also show some striking peculiarities. The nuclei of these cells present unusual varieties of form and size. The superficial cortex layer is occupied by a great number of spider cells, a smaller number of cells showing dark-stained, small, round nuclei and a few rod cells. In the 3-4 cell layer (Brodmann) of the cortex a remarkably large number of rod cells (Nissl and Alzheimer) of typical form are observed. The nuclei of these cells are abnormally elongated (17-18 micra), having round ends and fine prolongations. In the deepest part of the cortex there is a larger number of the shorter and plumper form of rod cells, which correspond to the second group in Ulrich's classification. In addition to these rod

cells there are small, round nuclei of various forms. There are still other forms, including transitory forms between rod cells and glia cells.

The rod cells in this case do not show direct topic relationship to the vessels, contrary to the claim of Nissl and Alzheimer that this is one of the very common findings for these cells. Nevertheless, many rod cells are found as trabant (satellite) of ganglion cells as described by Cerletti. Some of them seem to embrace the body of the ganglion cells and are found, not only along the apical prolongation, but at the base of the cell body. The rod cells have been observed by various authors in multiple sclerosis but not in diffuse sclerosis. According to Nissl the rod cells are not found in a sound brain, but are found principally in the paralytic brain and occasionally in other diseased conditions, but playing a less important part. Spielmeier found the rod cells in tubercular meningitis combined with general paralysis, while Dupré found them in arteriosclerotic processes associated with general paralysis. These authors are of the opinion that the rod cells indicate paralytic processes rather than other conditions. Sträussler found these cells in smaller numbers in a normal subject but abundant in congenital atrophy of the brain and gummatous meningitis. So far as the genesis of these peculiar cells is concerned the opinions of different authors vary. Some propose the ectodermal origin, others insist on the mesodermal. The second theory divides again into three different ones, — namely (1) derivation from the adventitia; (2)* from the endothelium; and (3) from the connective tissue of the pia mater. The first theory is affirmed by Cerletti and Sträussler, and the second by Nissl and Alzheimer. Ris, Achúcarro and Ulrich believe both in mesodermal and ectodermal origins. In this present case the writer believes firmly in the gliogenous theory, because —

1. The rod cells are found together with abnormally increased glia cells.

2. There is every transitional form between rod cells and glia cells.

3. There are many typical trabant rod cells.

4. The direct relationship between vessels or pia mater and rod cells is not proved.

5. The rod cells are found in the cortex, where the alterations of the vessels are not remarkable.

In the white matter of the brain there are a greater number of pale, large nuclei of various forms, such as ovoid, ellipsoid,

pear-shaped, kidney-shaped, rod-shaped, etc. In the neighborhood of the cystic areas the glia cells show more or less distinct regressive processes. The nuclei are dark stained, have no fine architecture, and some of them appear to be contracted, while others show evidences of disintegration. There are only a few atypical rod cells in the white matter.

In the peduncle, pons and medulla the gliosis is most remarkable. There are almost all imaginable sizes and forms of the nuclei. In addition to the ones with round, oval, ovoid and spindle forms there are many striking varieties of queer forms — club-shaped, biscuit-like forms, crook-neck squash forms and other peculiar shapes; bodies of nuclei with sprout, knob and prolongation, notching and lacing. Some of them are very well likened to the various forms of the motile ameba. The writer is of the opinion that these forms indicate the direct dividing of the nuclei, as was claimed by Lotmar in cases of glioma.

In the cerebellum glia cells are found very much increased in the Purkinje cell layer and in the white matter. Forms and sizes of the nuclei are manifold as in other places, showing also fairly abundant specimens of the rod cells.

Throughout the spinal cord glia cells, though not so numerous as in the brain stem, are abnormally increased. Here, rod cells of atypical form are observed, together with nuclei of various forms and sizes.

The new formation of the glia fibers is remarkable at the cell free border of the cortex, especially at the central region of both hemispheres. This fiber network of the border is considerably widened, and at the same time the increase of fibers going into the cortex layer is apparent; the fibers are well demonstrated deep into the 4-5 layer (Brodmann). The increase of glia fibers is not limited to the free surface of the cortex, but is also around the vessels, making a thick envelope. This envelope formation is readily understood, if one is acquainted with the condition, which Nissl, in agreement with Weigert, has emphasized, — that the vessels, being of mesodermal origin, behave toward the nervous tissue like a foreign body, and therefore are isolated by a layer of the glia. The envelope formation is extremely marked at the central region of the right hemisphere. So marked a protecting wall is not seen in general paralysis or arteriosclerosis, in which the perivascular growth of the neuroglia fibers is commonly observed. The extraordinary formation of the protecting wall should be considered as a result of the exaggerated function of the pathological neuroglia. In the region of the softening, the formation

of the glia fibers is not remarkable, but at the internal capsule and the lenticular nucleus of the left side the brain matter is entirely occupied by a dense network of rather fine fibers.

The vessels of the brain are more or less sclerotic. In the central region of the right hemisphere the walls of the vessels are considerably thickened, and in certain parts an abnormal growth of the adventitious tissue is seen forming tumor-like bodies. Some of the cells of the vessel wall seem to be isolated and are scattered in the brain matter. A similar process is observed by Bonome, Bielschowsky and Ranke in glioma. The perivascular lymph spaces, especially in the above-mentioned parts, are dilated, and large numbers of cells carrying pigment, a smaller number of fat corpuscle cells and a few lymphocytic cells are observed. The alterations of the vessels are only marked in the circumscribed areas of the right hemisphere, and not generally over the whole brain. Although there are softened areas and cells carrying pigment around the vessels, the whole process of the gliosis cannot be considered as a secondary change due to the primary vascular alteration.

Besides the remarkable findings of the sustaining tissue there are a number of interesting changes in the cerebellum. Here the Purkinje cells are not remarkable in form and size, but a considerable number of Purkinje cells are found high up in the molecular layer and present a typical case of so-called Heterotopia. In addition to this peculiar finding there is swelling of the dendrites and the axis cylinders. The swelling of the latter has been observed by the writer in various kinds of brain diseases, but the former is found only in selected cases and very rarely. Besides those of the amaurotic family idiocy, Sträussler described the same kind of swelling, with the enlargement of the axis cylinders, in a case which manifested certain cerebellar symptoms, agitation and intellectual weakness.

The author attributed this peculiar change of the dendrites to the acquired factor playing upon the congenital weakness. In our case the abnormal smallness of the brain and the heterotopy of the Purkinje cells all together point to the congenital disturbance of the development. The writer considers, therefore, that this peculiar swelling of the dendrites has resulted from the external factor playing upon the inherited weakness. Upon this peculiar change, however, the writer intends to publish in a later communication his further observation and his opinion.

PATHOLOGICAL CONSIDERATION OF THIS CASE.

The pathologic anatomical findings in this case are, as described above, very much complicated, and make the correct interpretation of the case extremely difficult. Among the remarkable findings the universally appearing gliosis of the whole central nervous system could reasonably be considered as the principal pathological feature of this case. But can the term "diffuse sclerosis" be applied, and are those manifold symptoms covered by this diagnosis?

Before going into further discussion let us briefly state what is diffuse sclerosis. Macroscopically this disease is characterized by an abnormally firm consistency of the medullary substance. Chronic internal hydrocephalus and the thickening of the pia mater are also frequent findings. Although the macroscopical findings are very characteristic, the histological substrata are rather vague in appearance. Some of the cases are classed as pseudo-sclerosis because of the negative findings, in spite of the macroscopical characteristics. In the histological findings the abnormal growth of the interstitial tissue is described as an essential anatomical factor. This process is, however, usually restrained in the medullary substance. Hyperplasia of the glia in the cortex has been heretofore very rarely observed and always accompanied by degenerative process of the nervous parenchyma. In the medullary substance most authors observed complete disappearance of the myelin sheaths, with more or less decided demarcation against the normal tissue, and with relatively well preserved axis cylinders. Infiltration of the perivascular lymph space with fat corpuscle cells and lymphocytes is observed by nearly all authors. Cyst formation, or softening, is reported very rarely. The polymorphous condition of the nuclei of the glia cells was observed only by Schilder. There is no case reported showing an unusual growth of the rod cells, either in the cortex or marrow. The cerebellum is very rarely involved in the pathological processes, showing increase of the glia mostly in the medullary substance. In the spinal cord the sclerosis is very marked. Besides the gliosis in the pyramidal tracts the degeneration of the latter is observed as one of the most frequent findings.

In our case the macroscopical finding of abnormally firm consistency of the medullary substance corresponds exactly with the case of diffuse sclerosis. The pia mater is thickened, though there is no internal hydrocephalus. Microscopical findings are

not exactly typical; at least, they differ in certain respects considerably from those reported by Heubner or Haberfeld and Spieler. However, as was mentioned before, there are no definite microscopical findings for this disease, and our case is reasonably grouped with this kind.

In the first place, we have to differentiate our case from the diffuse glioma, with regard to the cyst formation, which is rather characteristic for the glioma, and also with regard to the extreme polymorphous condition of the nuclei of the glia cells.

The cyst formation, though it is very characteristic for the glioma, is not an absolutely new finding for the diffuse sclerosis. Rossolimo observed a large cyst in a case of the typical multiple sclerosis. Schilder found also small cysts in a case of the diffuse sclerosis, which he called *encephalitis periaxialis diffusa*. As for the polymorphous condition of the nuclei of the glia, our case certainly presents an astonishing example. Even in glioma, findings like this, except in the case of Lotmar, have not been described. But Schilder observed almost exactly the same condition of the nuclei in his diffuse sclerosis case. There are still quite a few points which lead us to consider this case as diffuse glioma. In the latter the boundary of the growth is indistinct, and there is no change of the external configuration. Our case is similar to diffuse glioma and differs from the reported case of the diffuse sclerosis, since it shows no distinct demarcation between the degeneration and the normal parts. In the reported cases the axis cylinders of the focus remained in a relatively healthy condition, while in our case, as well as in diffuse glioma, the degeneration of the myelin sheaths is always parallel with that of the axis cylinders. The findings in the vessels, especially the infiltration of the adventitious cells into the brain matter, are very peculiar, and these are described by Bonome, Bielschowsky and Ranke in glioma. Admitting all these similarities, our case, in which the increase of the glia element is universal and distributed equally over the whole central nervous system, can in no way be considered as a diffuse glioma.

In the second place, general paralysis should be considered on account of the slight pial and perivascular infiltration and remarkable thickening of the fiber network of the border. The appearance of the abundant rod cells indicates also general paralysis. Blood serum was positive for Wassermann test, though the spinal fluid was negative for ordinary laboratory tests. But one of the most important findings for the general paralysis, *i.e.*, the degeneration of the ganglion cells, is not ob-

served. Eighteen years' duration of the mental disease does not indicate general paralysis. Negative laboratory tests of the spinal fluid together with above-mentioned circumstances will safely rule out general paralysis.

What is the etiology of this disease? Is it an exogenous or an endogenous disease of the central nervous system? Is the hyperplasia of the interstitial tissues secondary to the degeneration of the nervous parenchyma, or is it a primary overgrowth of the sustaining tissue which in consequence causes the degeneration of the nerve element? This is a very difficult problem to answer.

Strümpell calls this pathological process "chronic interstitial encephalitis" on account of the inflammatory character of this disease. Weiss is of the same opinion. Rebizzi, differing with these authors, claims it to be a primary disease of the nervous element with consequent growth of the neuroglia. In general, modern pathologists seem to have a tendency to deny the primary growth of the sustaining tissue, which is generally called "chronic interstitial . . . itis." Among the still obscure etiologies of this disease there are lues (both congenital and acquired), brain trauma, acute infectious disease, hereditary neuropathic taint and some unknown toxic agents, etc. But most authors are of the opinion that this disease is, in fact, only a terminal stage of various different diseases.

Let us first analyze, briefly, the pathologic anatomical findings of our case, and go over the etiology of our particular case. In our case there are a number of hypoplastic conditions of the brain and the body organs. The brain is abnormally small with apparently simpler convolutions. The heterotopia of the Purkinje cells is an unusual condition, which indicates a disturbance of development as does the high position of the left tube and ovary. Furthermore, the swelling of the dendrites suggests, as was explained before, the congenital weakness of the nerve element. All these facts point to the congenital factors underlying in this case. The glia cells in this case seem to have had congenital predisposition — to be attacked by an external agent. Schilder's case showed also hypoplastic condition, such as chlorotic aorta and absence of the ovary on one side, though there were no abnormalities in the brain. Haberfeld and Spieler observed two brothers who died of this disease, which, in both cases, showed the same symptoms and ran the same course. All these suggest together with our case the endogenous component underlying in this disease.

In our case the newly formed glia cells are not uniform in char-

acter. The glia cells of the cell free border are apt to build more fibers. In the cortex layer, contrary to this, there are a remarkable number of rod cells of gliogenous origin, with a small number of glia cells having large and small nuclei. In the medullary substance of the cerebrum there are more large nuclei than small ones. In the brain stem the proliferative process is most marked. Here there are almost all imaginable forms of the nuclei, suggesting direct division of the cells. The polymorphous condition of the nuclei in the cerebellum and the spinal cord is not so marked as in other parts, though there are a variety of forms and a considerable increase of the cells. In brief, the newly formed glia cells show topic diversity which is not at all associated with the degenerative process of the nerve parenchyma. This topic diversity, with the exception of the active proliferative process in the brain stem, seems to express the different functions of the neuroglia cells. But these functions are performed only in an exaggerated manner, the glia cells of the border, for example, producing luxurious fibers, and the cells of the cortex exhibiting peculiar shapes of the rod cells, etc. There is no reason, therefore, in our case, to consider that the general gliosis is a secondary process due to a primary nerve degeneration. It is more probable to presume that the proliferative process is a primary one. Our case, in this sense, is neither a terminal stage of the disease of the nervous parenchyma nor a chronic interstitial inflammation. It is rather to be grouped with neoplasma such as diffuse glioma.

CLINICAL CONSIDERATION IN REVIEW OF THE PATHOLOGIC ANATOMICAL FINDINGS.

The diffuse sclerosis which has been reported is a disease occurring in young individuals. With the exception of Strümpell's case (sixty-six years of age) all cases began in childhood or at least in the beginning of puberty. Schupfer's case is nine years of age; Rossolimo's case, sixteen; Ceni's case, nine; Beneke's, one and three-fourths; Haberfeld and Spieler's, seven; etc., etc. Both sexes seem to be attacked equally.

The clinical symptoms which have been reported, consist of spastic paralysis and progressive dementia. The disease is fatal, the duration being only several years. The cause of death is usually malnutrition and decubitus.

Our case is clinically as well as pathologically considerably different from those already reported. The onset of the disease

is very late. The duration of the disease is eighteen years. She did not show typical spastic paralysis, though she showed oftentimes disturbance of the gait and evidences of hemiplegia. The most apparent symptom, especially in the former half of the course, was a manic-depressive manifestation. The hemiplegia is explained by the softening of centrum semiovale and the internal capsule. But how is the manic-depressive condition explained? The writer presumes an intermittent growth of the neuroglia, as in cases of glioma. And this intermittent growth seems to be expressed clinically in alternating symptoms which in the later half become very much more prominent; the cyst and the softening of the centrum semiovale, especially in its anterior part, will give the satisfactory explanation. The fainting spells with unconscious periods are explained easily by so marked a change in the cortex.

CONCLUSION.

The writer presents a case of diffuse cerebrospinal sclerosis, which both clinically and anatomically considerably differs from the cases already reported.

It showed in the beginning almost typical manic-depressive manifestations, but later, the constantly progressing dementia was in the foreground. The patient showed evidences of hemiplegia, but the spastic paralysis was not as marked as in a case of Heubner form.

The principal pathological anatomical findings are: abnormally firm consistency of the medullary substance with softened and cystic areas, diffuse increase of neuroglia element in various forms, diffuse degeneration of the myelin sheaths and axis cylinders of the white matter, etc.

As for the etiology of this disease the writer assumes an endogenous factor, based on a number of hypoplastic conditions of the brain and the body organs.

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AGREEMENT IN RESULTS OF THE WASSERMANN
REACTION: A STUDY OF TESTS PERFORMED
BY TWO LABORATORIES IN THREE THOUSAND
SUCCESSIVE HOSPITAL ADMISSIONS.*

BY HARRY C. SOLOMON, M.D.,

MEMBER OF THE MASSACHUSETTS STATE PSYCHIATRIC INSTITUTE, BOSTON.

It has been the custom at the Psychopathic Department of the Boston State Hospital, for the past few years, to have the blood of each patient examined by two independent laboratories. This was done primarily for the safeguarding of the patient against erroneous conclusions based on one test; and, secondarily, in order to obtain information which would be valuable to ourselves in estimating the results of the laboratories; that is, to put us in a position in which we would be able to interpret the findings more correctly. The two laboratories selected for this purpose were the laboratory of the Massachusetts Department of Health and the laboratory of the Boston City Department of Health. Dr. Hinton and Dr. Castleman, of the respective laboratories, were most co-operative and desirous of having this work carried out, both for our own information and for what service it would be to them in estimating their own work. The spirit of these men cannot be too highly commended, and the results that are presented herewith are indicative that not only in this respect, but in all others, they have attempted to bring a high standard into their laboratories.

A Wassermann test made on each patient admitted to the hospital is, and has been, a routine since the opening of the hospital. During the time that the tests were made in the two laboratories, it was customary to bleed the patient into two test-tubes, one tube being sent to the city laboratory, the other to the State laboratory, conditions thus being as nearly similar as possible. To date, 3,000 patients have had their blood tested in this way. In some cases the test was repeated several times, especially in those cases in which there was a difference in the report.

* From the Massachusetts State Psychiatric Institute. Reprinted from the Journal of the American Medical Association, March 20, 1920, Vol. 74, pp. 788-790.

Without going into any details of the technic used by these two laboratories,* it may briefly be stated that Laboratory A uses three cholesterinized antigens of different sensitivities to check each positive reaction; Laboratory B, in addition to the cholesterinized antigen, employs an acetone insoluble antigen.

Whenever possible, those cases in which the reports were not the same from the two laboratories were retested, in an endeavor to get a report free from technical error. Unfortunately, the patients, as a rule, stayed only a few days at the hospital, and it was not possible to carry this out as far as was desired in many instances. However, in a number we were able to get a uniformity of results after the first test, rather indicating that the result of the first test might have been due to some technical error; and this, as a possible explanation, is further borne out by the fact that some cases were tested many times by one laboratory, with the result that occasionally a case giving consistently positive results for ten, fifteen or more tests, would suddenly give a negative reaction, to be followed again by a series of positive tests. It is possible, of course, that this may have been due at times to some change in the patient's serum, a condition which is not so very likely, and which, at any rate, is not explicable. Of especial interest in this work is a group of tests which we have made on children suspected of congenital syphilis, and who all fall into a class of poorly nourished and mentally retarded children. In this group we found a series of reactions differing from one another somewhat as follows: doubtful, negative, positive, negative. We have never noticed this result in adults or in apparently healthy children. In these cases we have felt that the Wassermann reaction has not been of especial value in determining our diagnosis of congenital syphilis.

The tests are reported a little differently in the two laboratories. Laboratory A reports "positive, doubtful and negative," the positive test representing what is sometimes spoken of as a + + + + reaction, which is a strongly positive test in the three antigens used. The doubtful reaction is reported in those cases in which one or two of the antigens gave a strong inhibition of hemolysis, with complete or nearly complete hemolysis in the

* The designations Laboratory A and Laboratory B are used throughout, as this is not intended as an attempt to show relative merits of the two laboratories, but rather to indicate the value of the Wassermann test.

Variations in Three Thousand Cases.

| | Number. | Per Cent. |
|---|---------|-----------|
| Total number of variations, including those reported positive, moderately positive, or doubtful by one laboratory and negative by the other, | 197 | 6.56 |
| Cases reported positive or doubtful by Laboratory A and negative by Laboratory B, | 70 | 2.33 |
| Cases reported positive, moderately positive, or doubtful by Laboratory B and negative by Laboratory A, | 127 | 4.23 |
| Cases reported moderately positive or doubtful by either laboratory and negative by the other laboratory, | 77 | |
| Cases reported straight positive by either laboratory and negative by the other laboratory, | 120 | 4.0 |
| Cases reported straight positive by Laboratory A and negative by Laboratory B, | 42 | 1.4 |
| Cases reported straight positive by Laboratory B and negative by Laboratory A, | 78 | 2.6 |
| Cases in variation group known to be syphilitic, | 35 | |
| Cases in variation group known to be syphilitic reported positive by Laboratory A and negative by Laboratory B, | 20 | |
| Cases in variation group known to be syphilitic reported positive by Laboratory B and negative by Laboratory A, | 15 | |
| Possible false positives (including positive and doubtful) from Laboratory A (70-20), | 50 | 1.66 |
| Possible false positives (including positive, moderately positive, and doubtful) from Laboratory B (127-15), | 112 | 3.4 |
| Considering only the 42 straight positives from Laboratory A and subtracting the 20 known to be syphilitic (these happened to give straight positive reactions) the possible false positives are, | 22 | 0.73 |
| Considering only the 78 straight positives from Laboratory B and subtracting the number of these known to be syphilitic (5), the possible false positives are, | 73 | 2.43 |

other one or two antigens. Laboratory B reports "positive" for the strongly positive reactions; "moderately positive" for the reactions not so markedly positive, and "doubtful" when there is not a complete uniformity in the reactions of the different antigens. In both laboratories, "negative" represents the condition interpreted as the absence of the test for syphilis.

The accompanying table summarizes the results obtained in these 3,000 cases. (Approximately 15 per cent of the cases tested positive.)

It seems only fair to state that a moderately positive or doubtful Wassermann reaction is not sufficient evidence on which to base a diagnosis of syphilis, unless backed by other strong points. It is always advised that in such a case the test be repeated until either a strongly positive or a definitely negative reaction is established. Hence, in considering the possibilities of going wrong in accepting the reactions of one laboratory, one would consider only the cases that are reported as straight positives. As the table indicates, the percentage variation between the two laboratories, considering the straight positives, is only 4, a percentage which we consider exceedingly low, and justifying the technic of these laboratories to a high degree.

If the possibility of making an erroneous diagnosis of syphilis, based on a positive reaction from but one laboratory, is considered, we see that this is reduced greatly, in that the percentage from the one laboratory is 1.4, and from the other, 2.6. This is stated on the assumption that when one laboratory gives a negative reaction and the other a positive, the positive does not represent syphilis. This is obviously not a correct hypothesis, as we have to deal with cases which are undoubtedly syphilis, but which give negative reactions in one laboratory, due either to the weakness of the antigen, or to a technical error. We therefore went over the cases in which this discrepancy occurred, from the clinical standpoint, and considered only those cases in which very definite evidences of syphilis were obtained. This included cases in which the history was absolute, such as patients that had been known to have syphilis and had given a positive Wassermann reaction in the past and had been under treatment, or cases of syphilis of the central nervous system, in which the spinal fluid findings were positive. Many cases highly suggestive of syphilis, from the fact either that the patients were prostitutes or that they had had symptoms on which one would practically be justified in making a diagnosis of syphilis, were considered as not syphilitic, in order not to prejudice the conclusions in favor of the laboratory. Deducting the cases, then, that were undoubtedly syphilitic, we find that of the 3,000 cases tested, Laboratory A returned 22 positive reactions which were reported negative in the same cases by Laboratory B, and which did not give definite evidence of syphilis. This would make a possible "false positive" report (*i.e.*, a positive reaction, due to an error in the performance of the test, on a non-syphilitic serum) in only .73 per cent. From Laboratory B this percentage* was 2.43. These low percentages are undoubtedly higher than the facts justify, as there can be no doubt that some of these cases were syphilitic. However, if we accept these figures as the worst possible, they are still such that we can place a great deal of confidence in the reports of the laboratories. This study shows that it is possible to obtain "false negative" or "false positive" reactions. It should be emphasized strongly that these figures as given represent a discrepancy between the two laboratories on the first test. In the majority of cases, a uniformity of report was obtained on repetition.

* The blood frequently did not reach Laboratory B for three or four days after being taken. There is evidence that blood which has stood for some time may give positive results in non-syphilitic cases because of contamination.

While these figures are exceedingly low, and therefore very satisfactory, it is true that no matter how small the percentage of error may be, if it affects any given individual it is a 100 per cent error for that individual, and therefore it is the duty of the clinician to protect him as far as is possible. This can be accomplished in a number of ways. Several repetitions of the test giving uniform results is very good evidence that the result as reported is correct. Secondly, having the blood tested by two laboratories simultaneously affords a good check. If there is a discrepancy, that is evidence that one or the other test may be an error, and a repetition of the test is indicated. It should be emphasized that a knowledge of the laboratory and its standards, technic and method of reporting is more important in obtaining the information desired than the reports from a number of laboratories which may not be careful or accurate. In other words, it is the clinician's duty to know the possibility of error in the laboratory that he is using. It is much better to have a test repeated several times in a laboratory to whose technic one is accustomed than to have a single test made in several laboratories, which will only lead to confusion, especially when one remembers that the sensitivity of the antigens plays a considerable rôle.

It is true that occasionally on certain days things do not go entirely well in a laboratory, and it is found that one particular day may give a high percentage of positives. This affords a means of checking up the results, and is commonly used by the laboratory chiefs. Thus, it is usual to run known positive and known negative serums for this purpose. It is possible for the clinician to use a similar check on the laboratory. In hospital practice, in which a great number of tests are made each day, it is possible to draw a conclusion as to whether too high or too low a percentage of positives is received. For example, on a certain day, if we find that a number of cases in which there is no reason to suspect syphilis are reported as giving positive Wassermann reactions, we may be suspicious that something may have gone wrong in the laboratory. On the other hand, if our known syphilitics give negative reactions, this is also highly suggestive. Thus, the patient may be amply protected against incorrect reports, and the value of the Wassermann test greatly enhanced by the clinician himself.

A comparison of the results as shown in this study with results expected from other laboratory tests seems to us to be extremely satisfactory. The results would seem to be as good as one would

expect from a Widal reaction, a Schick test, a diphtheria smear, or a single examination of the urine in a case in which nephritis is suspected. It is only fair to admit that we were somewhat surprised to find how well the tests of these two laboratories checked. Until we really added up the figures, our impression was that there were very many more variations. This was undoubtedly the result of the individual equation. Each instance in which there was a discrepancy stood out strongly and clearly, whereas those that agreed were passed over without any consideration whatsoever.

SUMMARY.

The blood serums of 3,000 patients were subjected to the Wassermann tests by two independent laboratories. An analysis of the results showed that there was a complete uniformity in the findings of the two laboratories in 93.44 per cent. The 6.56 per cent variation included cases reported as doubtful. Considering only the variation of cases reported positive by one laboratory and negative by the other, the percentage variation was 4. This was 1.4 per cent positive in one laboratory and 2.6 per cent positive by the other laboratory. Some of the cases reported positive by one laboratory and negative by the other were known to be syphilitic, so that the negative reaction was the incorrect one. Considering, then, the cases that either laboratory may have reported as positive in nonsyphilitic cases, the percentage was 3.16. This is probably a higher percentage for false positives than actually occurred, as some of these cases were presumably syphilitic. This percentage variation is based on only one test. Repetitions resulted in a uniformity of findings in the majority of cases. This is considered a good testimony for the accuracy of the tests as performed in these two laboratories.

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Volume V

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BULLETIN

OF THE

MASSACHUSETTS DEPARTMENT
OF MENTAL DISEASES

(PUBLISHED QUARTERLY)

COMMEMORATING FORTY YEARS OF SERVICE IN
MASSACHUSETTS INSTITUTIONS

1881-1921

JULY, 1921

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT BOSTON



Everett Flood, M.D.

Superintendent Monson State Hospital Twenty-three Years.
Superintendent Hospital Cottages for Children Twelve Years.
Assistant Physician Worcester State Hospital Six Years.

ANNIVERSARY OF EVERETT FLOOD, M.D.

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EDITED UNDER THE PROVISIONS OF SECTION 11, CHAPTER 123, GENERAL LAWS,
BY

WALTER E. FERNALD, M.D.

GEORGE M. KLINE, M.D.

JULY, 1921

PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

CONTENTS.

| | PAGE |
|--|--------|
| Expressions of Trustees relative to Dr. Flood | 5 |
| Resolutions of Women's Board | 6 |
| Resolutions of Trustees of Monson State Hospital | 7 |
| Dr. Everett Flood. Summary of Degrees, Positions, etc. | 8 |
| 337 (1921.14). Everett Flood, M.D., and Research Work done at the Mon- son State Hospital | 9-11 |
| WM. N. BULLARD, M.D. | |
| 335 (1921.12). Brown-Séguard Epilepsy | 12, 13 |
| L. B. ALFORD, M.D. | |
| 336 (1921.13). Medico-Legal Insanity and the Hypothetical Question | 14-28 |
| L. VERNON BRIGGS, M.D. | |
| 338 (1921.15). Focal Infection | 29-33 |
| J. F. ROCHE, D.D.S. | |
| 339 (1921.16). The Education of the Epileptic Child | 34-36 |
| HELEN TAFT CLEAVES, M.D. | |
| 340 (1921.17). Factitious Dermatitis | 37-40 |
| DAVID E. HARRIMAN, M.D. | |
| 341 (1921.18). Combined Psychoses | 41-43 |
| R. A. GREENE, M.D. | |
| 342 (1921.19). Beginnings of a New Departure in Sex Thought and Action | 44-48 |
| W. F. ROBIE, M.D. | |
| 343 (1921.20). Surgery at the Monson State Hospital | 49, 50 |
| JOHN M. BIRNIE, M.D. | |
| 344 (1921.21). An Institute for the Study of Convulsive Phenomena | 51-53 |
| D. A. THOM, M.D. | |
| 345 (1921.22). The Time Elapsing between Onset of Epilepsy and Admis- sion to the Hospital in 119 Patients at the Monson State Hospital | 54-58 |
| PETER P. LAWLER, M.D. | |
| 346 (1921.23). The First Eighteen Months of the Monson State Hospital Laboratory | 59, 60 |
| A. E. TAFT, M.D. | |
| 347 (1921.24). Epileptic Auras | 61-66 |
| H. M. WATKINS, M.D. | |
| 348 (1921.25). Efficiency of Epileptic Workers | 67-91 |
| EVERETT FLOOD, M.D. | |
| 349 (1921.26). The prognosis and Treatment of Epilepsy | 92-98 |
| MORGAN B. HODSKINS, M.D. | |

EXPRESSIONS FROM THE TRUSTEES OF HOSPITAL COTTAGES FOR CHILDREN ON RESIGNATION OF DR. FLOOD.

BALDWINSVILLE, July 12, 1899.

Dr. EVERETT FLOOD.

At a special meeting of the trustees, held at Worcester June 7, your resignation as superintendent of the Hospital Cottages for Children was accepted by the Board. We now desire to express the deep regret accompanying our action. You have long been associated with us in the work of the hospital, and we have looked to you as the pioneer in the work, we accepting your leadership gladly, and, aiding and sustaining you in your plans and aspirations as our means and resources would permit, we would gladly have endorsed more fully many of the plans your inspiration suggested had our means been greater. We feel that we have been associated not only with a professional man of high ability and attainment, but with a "Christian gentleman" as well, and we shall cherish the memory of our mutual labors with warm pleasure. Wishing you entire success in your new field of labor, we remain very cordially

Your friends,

FRANCIS LELAND,
MERRICK BEMIS,
SARAH B. DEWEY,
CHARLES H. ALLEN,
SARAH E. WHITIN,
EDITH P. GREENE,
GILMAN WAITE,
F. W. RUSSELL,
H. M. SMALL,
H. AMELIA RAWSEN,
DAVID H. COOLIDGE,
LAURA L. CASE,
LIZZIE R. DOHERTY,
ARTHUR H. LOWE,
ROBERT N. WALLIS,
JAMES S. LEMON,
JOHN D. CORSON,
HOMER GAGE,

Trustees, Hospital Cottages for Children.

RESOLUTIONS OF WOMEN'S BOARD.

Whereas, Dr. Everett Flood, for so many years superintendent of the Hospital Cottages for Children at Baldwinsville, Mass., has been called to another field of usefulness; therefore

Resolved, That we, members of the Woman's Board, tender to him our sincere and earnest thanks for his long, wise, and loving service in the interests of the hospital and its inmates, — a service in which he has proved himself to be faithful in the least things as well as the greatest, and in the doing of which he has won the respect and affection of all associated with him — friends, fellow workers, and patients; and

Resolved, That, while deeply regretting the necessity which has taken so wise and efficient a superintendent from our hospital, we rejoice with him that a larger field of usefulness has opened before him; and wishing him the utmost success in his new duties we would cherish the hope that our mutual interest in each other may never be weakened, but may long continue an ever-increasing bond of sympathy and strength.

ANNIE M. L. CLARK,

LUCY B. FISHER,

EMMA L. DICKENSON,

For the Women's Board, Hospital Cottages for Children.

RESOLUTIONS OF TRUSTEES OF MONSON STATE HOSPITAL ON RESIGNATION OF DR. FLOOD.

MONSON, MASS., Sept. 15, 1921.

In view of the near approach of the date on which Dr. Flood's resignation as superintendent of the Monson State Hospital becomes effective, the Board of Trustees of the hospital desires to record its appreciation of his long and faithful service.

Coming to them, as he did, after previous service at Worcester and Baldwinsville, he brought a considerable measure of experience and the energy of young manhood. At the time of his coming there were only 9 buildings and less than 200 acres of land. During his administration 20 new buildings have been erected and 500 acres of land added to the holdings of the hospital, while the number of patients has increased from 400 to over 1,000.

Along with the duties of administration, which have multiplied with the increase of patients and physical equipment, he has carried on, directly and through his assistants, research work of importance, the results of which have appeared in the form of papers and addresses from time to time.

His standing as a psychiatrist is attested by the official honors conferred on him by members of his profession. His long record of service to the State entitles him to the honor and esteem of the Commonwealth. His untiring efforts in the upbuilding of this institution and his unfailing sympathy with its inmates constitute a lasting claim on its gratitude; therefore be it

Resolved, That the trustees of the Monson State Hospital hereby express to Dr. Everett Flood their appreciation of his devoted and sympathetic work for the hospital, their deep regret at the severance of the official relations which have existed harmoniously for so many years, and their personal wishes for his future health and happiness.

GEORGE A. MOORE.
GEORGE D. STORRS.
MARY B. TOWNSLEY.
ELIZABETH E. HORMEL.
HENRY K. HYDE.
WILLIAM JAMESON.
J. UBALDE PAQUIN.

DR. EVERETT FLOOD.

SUMMARY OF DEGREES, POSITIONS, ETC.

1879, Colby, A.B.

1882, Colby, A.M.

Two years president of the class, and editor of the "Colby Echo," etc.

1881, Bowdoin Medical College, M.D.

Member of Massachusetts Medical Society.

Member of New England Society of Psychiatry.

Member of Boston Society of Psychiatry and Neurology (president).

Member of the Rhode Island Medical Society.

Member of the Hampden District Medical Society (president).

Member of the American Academy of Medicine (vice-president).

Member of the National Society for the study of Epilepsy (president).

Student for six months in the University College Hospital, London.

Student for six months at the University of Berlin.

Several courses at the Post Graduate School, New York.

Member of the American Medical Association.

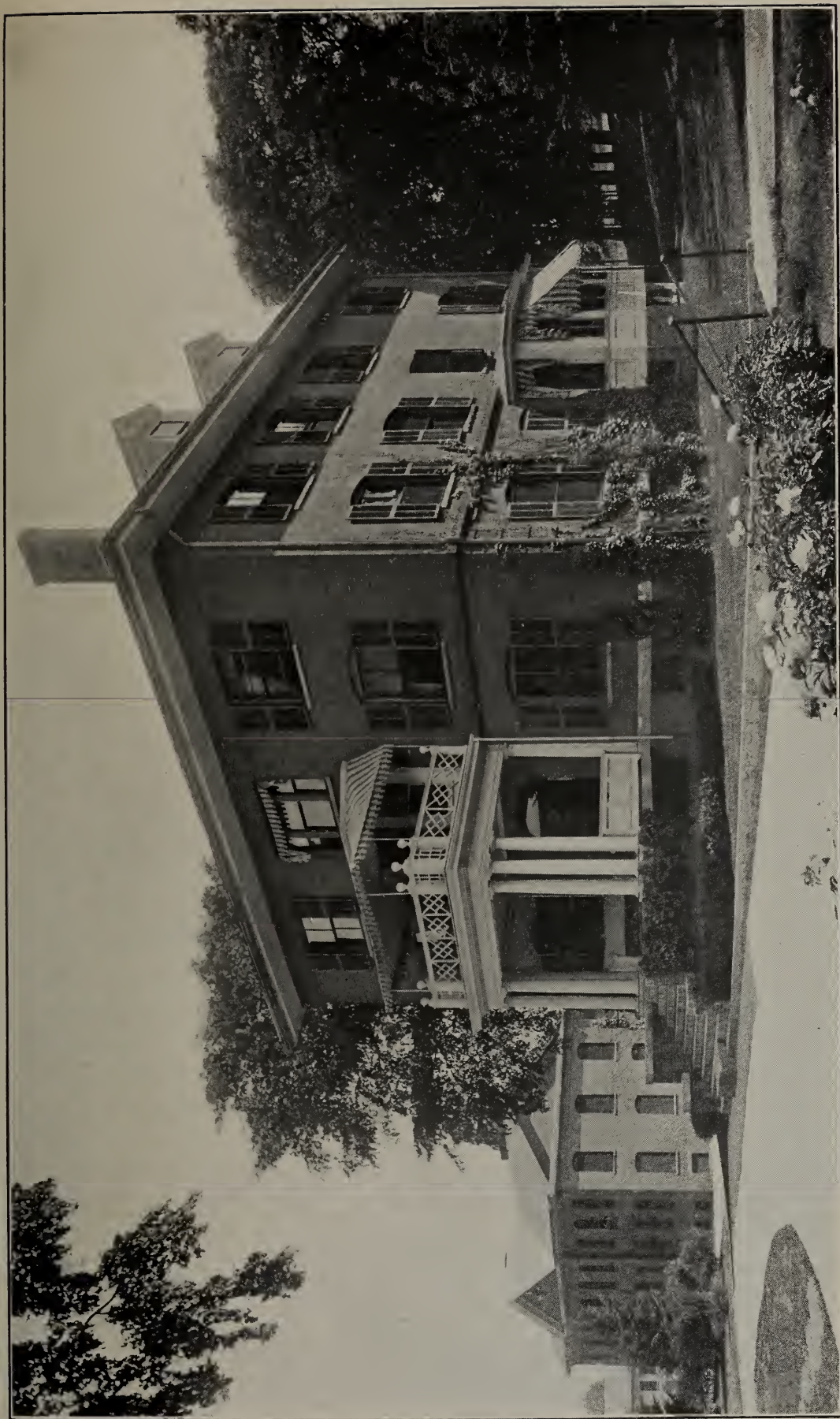
Member of the American Psychiatric Association.

Assistant Physician, Worcester State Hospital, six years.

Superintendent, Hospital Cottages for Children, twelve years.

Superintendent, Monson State Hospital, twenty-three years.

Warden and treasurer, St. Mary's Mission, Palmer.



Administration Building, Monson State Hospital

SELECTED MEDICAL AND SCIENTIFIC STUDIES.

EVERETT FLOOD, M.D.

AND

RESEARCH WORK AT THE MONSON STATE HOSPITAL.

BY WILLIAM N. BULLARD, M.D., BOSTON, MASS.,

FIRST PRESIDENT, BOARD OF TRUSTEES.

Dr. Everett Flood was the second superintendent of the Monson State Hospital. He succeeded Dr. Owen Copp who became superintendent immediately after the establishment of the hospital by the State Legislature in 1895, built all the early buildings of importance and organized the hospital. Under his superintendency the hospital was opened and received its first patients, and was prepared for its future development.

In June, 1899, Dr. Flood assumed charge as superintendent. The hospital, though now open and receiving patients, comprised 8 buildings (2 only for patients). There were about 200 patients. Now the number of buildings in the institution is 34 (15 for patients) and the patients number between 1,000 and 1,200. All this increase has taken place under Dr. Flood's administration. Parallel to the increase in the number of buildings and patients, and the accessories of these, attendants and physicians, the duties of the superintendent have necessarily changed. In a small institution containing few patients and no, or only one, assistant physician much detail falls of necessity upon the superintendent. He knows each one of his patients personally, and can himself decide and arrange the special care and treatment required in each case. As the hospital enlarges, personal detailed knowledge of each case is impossible and must devolve on junior officers, while the superintendent must have time to devote himself to the larger and more important questions of administration. It is in the management of these, rather than in personal care of detail, that the experienced superintendent shows his genius and ability.

To describe in detail the gradual growth and changes in an institution of this sort would be tedious and is unnecessary. I will speak of only one direction of its activities, — that of its scientific and research work. In 1910 the Monson State Hospital obtained a trained worker from Dr. Davenport at Cold Spring Harbor, N. Y., to search out and record the family histories of patients. This was, I believe, the first worker of this kind employed by any State hospital in Massachusetts, and there were very few such workers in the country. The Monson State Hospital was a pioneer in this work. In the beginning the worker was paid, at least in part, by Dr. Davenport, but received board and lodging and traveling expenses from the hospital. It was a very interesting and useful work, so that it was continued for a second year at the expense of the hospital. The result is that there is now at the hospital a series of family records of epileptics which are important and should be collated and edited. The more striking examples of such family histories have been published in various places and by various authorities, but much remains to be done with them.

The histories of those families which are most afflicted, in which there is a considerable proportion of epileptics, imbeciles and criminals, have been emphasized and much discussed. Thus far, however, I am unaware that as much consideration has been given to those family histories in which there is only one afflicted and the rest of the members seem normal, or to the families of normal people, to compare with those of epileptics and to determine the amount of affliction in these families of native American stock or otherwise. It is well known that in many families which are considered normal there are members who do not reach the normal level of mental health, and we ought to know what the mental health is in the average — so-called normal — American family in this State. Investigation scientifically conducted upon this question, while not so striking or interesting to the investigator, is now quite as important socially as investigation into the families of epileptics, and would afford a standard of comparison not otherwise to be obtained.

On Jan. 1, 1909, Dr. Annie E. Taft was appointed research officer and assistant physician. She was expected to do not only the routine pathological work of the institution, but a certain amount of research work. While at the hospital Dr. Taft made numerous experiments with guinea pigs in relation to "Brown-Séquard Epilepsy" repeating Brown-Séquard's experiments.

Brown-Séquard had stated that the children of certain guinea pigs in whom the Brown-Séquard epilepsy had been produced after section of a sciatic nerve had developed such epilepsy, and this fact was used as a classical example of the inheritance of acquired traits or conditions. Dr. Taft showed that it was only in the descendants of "epileptic" guinea pigs who themselves had lost toes that these convulsions could be developed. Her paper, entitled "Report of a Study of Brown-Séquard's Epilepsy of the Guinea Pig," was a valuable contribution to research. Dr. Taft resigned August, 1910. Her place was filled by the appointment of Mr. Leland B. Alford. He continued the investigations of Dr. Taft and determined that the probable cause of the syndrome — scratching and convulsive movements — was the irritation of lice at places where the animal could not effectively scratch. Mr. Alford left the hospital in August, 1911. In 1912 Dr. Thom was appointed assistant physician and pathologist to succeed Dr. Taft and Mr. Alford. One hundred brains were photographed this year by Dr. Taft and Mr. Herbert Taylor. In 1913 a paper, "Inheritance in Epilepsy," prepared by Miss Kendig, the field worker, was read at the Northampton Conference of State Charities.

Thus was research work carried on at the hospital in the early days. Later this has been continued in various ways, but was much interrupted by the war.

BROWN-SÉQUARD EPILEPSY.

BY L. B. ALFORD, M.D., ST. LOUIS, MO.

When the laboratory of the Monson State Hospital was established in 1909, investigation of the peculiar phenomenon in guinea pigs, known as Brown-Séquard epilepsy, was taken up by Dr. Annie E. Taft, and during the following year was continued by me.

In order to make clear the bearing of our work, it is necessary to give a short description of the phenomenon and of the work that preceded ours. Brown-Séquard found (1850) that some weeks following section of the sciatic nerve in the thigh (in guinea pigs) some change in the nervous system had taken place by virtue of which pinching of the skin of the homolateral shoulder region was followed first by energetic scratching movements and later by a sort of convulsion not unlike that of human epilepsy. As the possibility of its human application was so obvious, Brown-Séquard, and many others after him continued to investigate the phenomenon, taking up such aspects as these: the peculiarity of the sciatic nerve whereby section of it alone, of all peripheral nerves, resulted in the tendency to convulsions; location of central nervous lesions leading to the tendency; extent of "epileptogenic" skin zone; trophic disturbances in the hair and skin of this zone; effect of age and state of nutrition of animals; transmission to offspring, and relation of scratching response to scratch reflex of "spinal" animals.

Dr. Taft repeated the work of preceding investigators and took up particularly the problem of transmission, which Brown-Séquard and others had found to take place. She found no evidence of such transmission, and called attention to the significant statement of Brown-Séquard, that in all affected offspring absence of toes from a hind foot had been noted.

My own experiments were directed to the elucidation of the bearing of injury to the sciatic nerve. It was found that the important factor was not injury to the nerve, but interference with normal spontaneous scratching movements, and that any other procedure having this effect, like removal of claws or injury to mid-brain, was followed by the tendency to convulsions. It

seemed that the immediate important result was the increase in frequency and intensity of scratching movements, which naturally followed upon disturbance in effectiveness of these movements, because when they ceased to occur (as they did when the animals were freed of vermin) the scratching reaction and convulsion could no longer be obtained. The "epileptogenic" zone was found to be limited to that part of the skin protected by the hind leg.

It would seem that following operation there occurs in the nervous system so great a facilitation of the scratch reflex, brought about by increase in scratching movements, that under certain conditions it takes precedence over other defensive reactions, and there also occurs an intensification of the reaction to sensory stimuli due to the unrelieved irritation from vermin, whereby overflow of impulses from the paths of the scratch reflex of the same side to those of the opposite takes place. The sum of scratching movements on both sides of the body at the same moment is the so-called convulsion.

From the preceding account it is evident that many points of Brown-Séquard epilepsy were made clear by work done in the laboratory of the Monson State Hospital. This work alone, not to mention that of Dr. Thom, later, along other lines, justifies the efforts of Drs. Flood, Southard and Bullard in establishing and supporting the laboratory.

I am glad to take this opportunity of expressing my gratitude for the co-operation accorded me by Dr. Flood while I was working with him.

MEDICO-LEGAL INSANITY AND THE HYPOTHETICAL QUESTION.

BY L. VERNON BRIGGS, M.D.,

SECRETARY, MASSACHUSETTS STATE BOARD OF INSANITY, 1914-16.

Both of these terms should be abolished. The hypothetical question should never be allowed in any court of justice. The determination of the mental condition and responsibility of the criminal should be the province of medical men and of no one else. Why should physicians be asked to pass upon legal responsibility? Their opinion in legal matters is not considered of any value by the lawyers. It is time that medical men took a stand, and by decisive action they alone are competent to decide upon the presence or absence of mental disease. It is as absurd for lawyers, or for the general public from which a jury is constituted, to give their opinion in a doubtful case of mental disease, as it would be in a doubtful case of pneumonia or appendicitis or cancer.

The question of insanity, as such, should be taken from "a legal, irresponsible jury," as Dr. Henry Maudsley calls them, and placed in the hands of a medical commission, whose decision would be final. If the judge who happens to preside over trials of capital cases should have a daughter afflicted with mental disease, about whose diagnosis, including the form of disease and responsibility, two physicians disagree, would he take his daughter and the two disagreeing physicians before a jury of laymen to determine which one was right, and to ascertain the form of his daughter's disease and the degree of her responsibility? Certainly not. And yet such is the procedure which we witness almost daily in our courts of justice.

From a recent article on "Expert Testimony," by Dr. William A. White, I gather the following: —

Strangely, and for what reason I know not, the expert who is not permitted to say that the defendant is sane or insane, because that sacred duty resides with the jury, is permitted to say whether in his opinion the defendant was responsible or irresponsible at a certain time. . . . The principles which I advocate are that the criminal, and not the crime, should be made the matter of prime consideration, and that the sentence,

or, better, the decision of the court, should be calculated to cure the social illness as it has been shown to exist in the conduct of the defendant. All cases of pneumonia are not treated alike just because the disease happens to be pneumonia. The patient is treated and allowances have to be made for age, previous condition of health, concurrent diseases of organs other than the lungs, power of resistance, etc. The patient is treated, and not the disease, and it is as illogical to sentence the person who has committed a certain offence to a specific term of imprisonment as it would be to decide, when a patient is admitted to the hospital, the day upon which he shall be discharged. Theoretically, I believe the jury should be limited to a determination of the facts; that is, in a criminal case have to pass only upon whether the accused did or did not commit the anti-social act as charged. If he is found guilty, then it is the right of the State to prescribe the treatment which, after careful consideration by those skilled in such matters, seems best calculated to have the best results in the end.

Keedy says, in a recent article on "Criminal Responsibility," that —

Mental disease constitutes a medical problem, and the diagnosis and symptomatology of it should be determined by a physician. Criminal responsibility, on the other hand, is a legal question, and the rules for determining such responsibility should be fixed by law and determined by the legal profession.

This suggests that a law should be passed fixing criminal responsibility; that is, if medical opinion states that there is a mental disease, then should the accused be held responsible? Perhaps at first the law should state that no man shall be tried who is suffering from an incurable mental disease or a chronic mental disease, or that no man shall be tried who at the time of the commission of a crime was suffering from mental disease. We have somehow got to do away with the question of responsibility, which is the root of all evil in medical testimony. For, as one physician says, "If a man has a mental disease, who can determine how far he is responsible?" It cannot be determined by physicians in hospitals for mental diseases, for if these patients are responsible, they should be taken out and tried and punished, which is never done because it is universally recognized that a patient suffering from mental disease in a hospital is not responsible for his acts. Therefore, why should a person suffering from mental disease outside of a hospital be any more responsible for his acts? If medical opinion is that a man who has broken the law or who has committed an overt act is suffering

from mental disease, whether serious or not, that person should be committed to a hospital for mental diseases, and should not be tried, convicted and sentenced to prison or executed.

Buckham of London as long ago as 1883, said: —

If it is considered imperatively necessary that the judges should determine the question of insanity by some "precedent" or "legal maxim," so as legally to control responsibility, then in the name of consistency change the law, so that the expensive farce of calling experts shall be abolished. While the question is sanity or insanity, let it be determined by medical experts who alone are competent judges of that fact.

Dr. William Wood of London, in 1852, proposed verdicts of "Guilty with extenuating circumstances," and said, by way of illustration: —

It is the immorality of the act, rather than the act itself, which deserves punishment, and this can only be estimated by weighing carefully all the circumstances which have led to its perpetration, and amongst these the most important of all is the mental condition of the accused.

He gives many instances of where the example of executions obviously had no effect in deterring other criminals. He gives the case of a man who killed the President of the Republic (France) on the 14th of September, 1851 (?). The jury brought in a verdict, "Guilty of murder with extenuating circumstances," and Jobard, the assassin, was condemned to hard labor for life. (Jobard was pronounced a monomaniac.)

In 1852 the judges of the House of Lords of England laid down as the established law of the land that an offender, even under the influence of insane delusion, was still punishable, according to the nature of the crime committed, if he knew at the time of committing such crime that he was acting contrary to law. Comparatively few, even of the inhabitants of asylums, but know the difference between right and wrong, and are able to appreciate the consequences of their acts.

There are certain types of individuals who certainly have an irresistible impulse to destroy themselves — we will say, to cut their own throats. This is usually condoned by society, but if the same individual should have just as strong an irresistible impulse to cut some one else's throat, the chances are he would be punished by the law. It is by no means uncommon to hear a burst of indignation at the acquittal, on the ground of in-

sanity, of some unhappy being whom society believes is a fit object for the law's vengeance.

Herbert Harley, in a recent paper on "Segregation *v.* Hanging," relates a case where the State expert of Illinois testified that one Zagar, who was being tried for murder, was sane, although previously he had been committed to the Cook County Psychopathic Hospital where the same expert, Dr. Neymann, recorded a diagnosis of paranoid dementia præcox. Harley says: —

In this case the public demanded a conviction and a hanging. It got both. The public is not consciously bloodthirsty, but assumes that hanging of individuals of this sort is an effectual way to prevent crime. If the execution of brutal murderers had the effect which it is intended to have, I would offer no objections, but the deterrent influence of dramatic punishments may be entirely lost on the particular individuals in which it is most needed. It is of little value to the community to hang one Zagar and have new Zagars coming on continually. Punishment does not restore the murderer's victim to life. Punishment and all the vast machinery of the law are worthless if they do not anticipate and prevent crime.

The prevention of crime implies the ability to recognize dangerous symptoms in the individual at a time prior to commission of a serious offence. Since the Psychopathic Laboratory of the Municipal Court of Chicago was established, there have been more than twenty-five instances of brutal murders committed by young men who were indexed in the laboratory files as individuals with dementia præcox and low intelligence. A person with dementia præcox may have normal intelligence, but abnormal emotional characteristics which are registered in conduct. The person of normal effectivity does the right thing more because it is natural for him to do so than because he fears punishment. The type of dementia præcox with keen intelligence produces burglars, automobile thieves, pickpockets, counterfeiterers and yeggmen. The unfortunate individual who is both mentally and morally defective is almost certain to break down under the stresses imposed by modern competitive living. The dementia præcox type with defective emotions often gets a reputation for bravery. They go to the gallows with apparently little concern. Every attempt at correction, which in the normal is effective in inducing good behavior as a habit, with them is only another step downward. It does little good to hang them. The public undoubtedly expects hanging, and they have little compunction

about hanging one who has brutally taken a life; but we do not control this situation by hangings. The sense of security the public thus feels is wholly unwarranted. The present right and wrong test is of no practical value. It gets us nowhere in our fight for society's right to be saved. The difference between right and wrong, as obvious to the normal person as the difference between black and white, is entirely an acquired sense in the case of the mental defective — the person born without a conscience. Not much longer can we hang these degenerates and feel that we have done all that is necessary. It is possible now to identify them after the commission of a minor offence. The law will have to deal with them eventually, and the only effective way is to isolate them before they have had an opportunity to kill.

Henry Howard, M.R.C.S.L., England, in 1882, wrote: —

A man has but one mind and that mind, a unit, either is or is not insane. We might as well say that a man has a partial typhoid fever as to say that he is partially insane. . . . Dr. Hammond gives a tabulated statement of 700 cases of post-mortem appearances collected from the idiot asylums, in only 60 of which were the appearances normal.

I must not overlook the fact of how difficult it is to find even two experts who agree upon a man's mental state when he is accused of crime. At the trial of Guiteau only one expert, Dr. Spitzka, attempted a scientific explanation of the phenomenon on trial, and he was insulted — most grossly insulted — by the district attorney, and called a veterinary surgeon because he was a student of morphology and zoölogy. . . .

Each man's moral responsibility depends upon his conscience, and each man's conscience upon his education; consequently what would be morally wrong in one man would be morally right in another. For instance, what would be morally right for the Jew would be morally wrong for the Christian, and *vice versa*. The same with the Catholic and non-Catholic.

On Dec. 6, 1881, Hugh Heyvern was hanged, and on Jan. 6, 1882, Professor Osler, then of McGill University, exhibited to the members of the Montreal Medical-Chirurgical Society the left hemisphere of Heyvern's brain. His paper was published in the "Canadian Medical and Surgical Journal" of Montreal, in February, 1882, and was entitled "On the Brains of Criminals, with a Description of the Brains of Two Murderers." In this paper he says: —

Mentally and bodily we are largely the result of an hereditary organization and the environment in which we have been reared.

Heyvern had previously been in jail more than twenty times, and may be taken as a good representative of the criminal class. The skull was somewhat ovoid in shape, dolicho-cephalic, the forehead rather low and retreating.

He then goes on to compare Heyvern's brain with the type of brain which Professor Benedikt of Vienna notes as the criminal's brain, and finds much in common, dwelling most on the confluence of many of the principal fissures, and in many other ways Heyvern's brain was found to conform to Benedikt's cases.

Howard quotes Kiernan as saying: —

An epileptic may perform an act apparently premeditated, and may appear to know the exact legal consequences of this act, and yet the act be the result of disease.

In speaking of Heyvern, he says: —

It is only natural for a man to try to escape from prison. The insane in lunatic asylums all over the world try every day to escape, and frequently successfully.

Every day there are examples in lunatic asylums of insane persons committing crimes which they have premeditated. Premeditation is no more a proof of man's sanity than is the right and wrong test which has so long disgraced our statute books. If knowledge of right and wrong be the test of insanity, then one-third at least of all those in asylums all over the world should be set at large.

Howard asked Dr. Osler two questions: First, did he recognize the brain of Heyvern to be abnormal? To which he answered, yes.

Society likes excitement. It delights in a good, well-hunted-up and well-discovered scandal, but it fairly gloats and gormandizes over a murder. The more brutal the murder the better for society. As a rule, it does not care a row of pins for the victim. In the case of Hugh Heyvern, he murdered a fellow prisoner named Salter. Society, when Salter was sentenced for crime, shouted "It served the scoundrel Salter right!" But when Heyvern killed Salter, society forgot about the villain and thirsted for the blood of Heyvern. So society could not rest until it had the blood of Heyvern. Society was also excited about this time about Guiteau, who killed President Garfield, so it cried out with a loud voice, "Whoever stands between Heyvern and death is the friend of Guiteau." So society worked itself up to a boiling point; nothing could cool it down but the blood of Heyvern. Then society got another terrible shock. It heard

that a criminal lawyer of great repute was going to defend Heyvern on the plea that he was an imbecile. So society literally boiled over and declared it would not be balked.

Dr. Howard, who was expert for the defence, says: —

Society never did listen to reason, and my efforts were of no use, for society had made up its mind. I tried to make them understand that, to a very great extent, society was itself responsible, and that society never attempted to make a scientific investigation and find out what was the cause of crime. The criminal code of to-day is just where it was two thousand years ago.

I said over and over again that I assumed Heyvern did know right from wrong, as the majority of insane persons knew right from wrong, but that the knowledge of right and wrong did not constitute sanity or responsibility. The Montreal paper at this time said, after Guiteau had been found guilty, "Why the man doesn't pretend to be insane!" — as if an insane man did pretend to be insane.

Guiteau's brain showed teratological and pathological defects. The former finding in the case of Heyvern proved him to be an imbecile.

A bill was introduced in the House of Commons in 1874, with the view of amending the law on homicide. A committee was appointed to take evidence. Lord Justice Blackburn told the committee, "We cannot fail to see that there are cases where the person is not clearly responsible and yet knows right from wrong." He then gave an instance, such as we frequently see. Sir A. Cockburn, Lord Chief Justice of England, stated to the committee: —

As the law as expounded by the judges in the House of Lords now stands, it is only when mental diseases produce incapacity to distinguish between right and wrong that immunity from the penal consequences of crime is admitted. The present bill introduces a new element: the absence of power of self-denial. I concur most cordially in the proposed alteration of the law, having been always strongly of opinion that, as the pathology of insanity abundantly establishes, there are forms of mental disease in which, though the patient is quite aware he is about to do wrong, the will becomes overpowered by the force of irresistible impulse; the power of self-control when destroyed or suspended by mental disease becomes, I think, an essential element of responsibility.

Charles Follen Folsom, M.D., in a book privately printed in 1908, on the subjects of criminal responsibility and limited responsibility, gives the history of many cases which are familiar

to the readers of this article. In summing up the case of Jesse Pomeroy, he says: —

Among the experts who have seen Pomeroy and consider him irresponsible, there are two opinions on this point: first, that punishment would have no effect upon him or upon others of his class; second, that punishment would deter them from crime. But the same thing might also be said of a considerable proportion of the inmates of our insane asylums.

In summing up the case of Charles Julius Guiteau, who killed President Garfield, he says: —

The verdict of the jury has met with almost universal approval, and many of the insane in asylums who feel that their own safety depends upon the maintenance of a high standard of responsibility there agree with the jury. Others think otherwise. The Pocasset murderer, for instance, says that the protection of society would be just as much influenced by one's walking out and stepping on an ant as by hanging Guiteau.

Guiteau has been observed chiefly while on trial for his life and at a decided disadvantage. Even if he were shamming, as I think he was to a certain extent, that is as characteristic of the insane as of the sane. It seems to me to belong to that class of insane criminals who do least harm to society after their crime by being secluded for life in a criminal lunatic asylum without trial, if that is practicable in our country.

In summing up the case of Marie Jeanneret, Folsom says: —

If we could eliminate from our nosology, and more particularly from our jurisprudence, the term "moral insanity" we should confer a boon on the medical profession and the world at large like that which came from abolishing Jonathan Edwards' "original sin." Of course, it was not many years ago that all men were criminals according to our present standard. Some of us, through centuries of breeding, have outgrown the grosser forms of crime; but the criminal instinct is well-nigh universal. What can organized society do in the matter for its safety, or even its very existence, but first and foremost maintain a high standard of responsibility, and at least keep its own head sound?

Of the case of Sarah Jane Robinson, who was indicted for six murders, and who was finally sentenced to confinement in prison for life, Dr. Folsom says, "She murdered in cold blood after mature deliberation and cool planning, and she kept the portraits of her victims always with her in jail and put upon them the flowers that were sent to her."

He also gives in detail the case of Jane Toppan, who was found insane and is now an inmate of one of our State institutions.

In 1906 E. P. Evans wrote a book on "The Criminal Prosecution and Capital Punishment of Animals," which was the result of a revision and expansion of two essays entitled "Bugs and Beasts before the Law" and "Modern and Mediæval Punishment," which appeared in "The Atlantic Monthly," in August and September, 1884. It seems that at one time in our history animals which were in the service of man could be arrested, tried, convicted, and executed like any other member of his household. In 1386 a sow who had killed one of her offspring was executed in the old Norman city of Falaise. In 1394 a pig was hanged at Mortaign for having sacrilegiously eaten a consecrated wafer. In 1314 a bull belonging to a farmer in the village of Moisy escaped into the highway, where it attacked a man and injured him so severely that he died a few hours afterwards. The ferocious animal was seized and imprisoned, and after being tried and convicted was sentenced to be hanged; and the execution took place at Moisy-le-Temple on the common gallows. In 1389 the Carthusians of Dijon caused a horse to be condemned to death for homicide; and as late as 1697 a mare was burned by the decision and decree of the Parliament of Aix.

When we execute a feeble-minded or *non compos* person or an insane person, such as a Guiteau or a Czolgosz, we have not advanced beyond the custom of seven hundred years ago when they executed animals for crime who were as responsible as many of these individuals, and who had in many instances been taught to know the difference between right and wrong, as many of our animals do know what is right and what is wrong for them to do. And the effect of such punishment as is meted out by society at the present time to these medically irresponsible individuals is no more deterrent than it was to those animals.

Mr. Evans states: —

If it could be conclusively proved, or even rendered highly probable, that the capital punishment of an ox which had gored a man to death deterred other oxen from pushing with their horns, it would be the unquestionable right and imperative duty of our legislatures and tribunals to re-enact and execute the old Mosaic law on this subject. In like manner, if it can be satisfactorily shown that the hanging of an admittedly insane person who has committed murder prevents other insane persons from perpetrating the same crime, or tends to diminish the number of

those who go insane in the same direction, it is clearly the duty of society to hang such persons, whatever may be the opinion of the alienist concerning their moral responsibility.

As it stands to-day, a man, if he knows the difference between right and wrong when he commits a crime, or if the prosecution can show that he had mentality enough to premeditate and plan the crime, or that he was not the victim of an irresistible impulse, or that he was so far responsible that he knew the consequences of his act and that he would be punished, is usually found guilty, no matter what the medical testimony may be as to his sanity. The medical expert may testify that he is suffering from dementia præcox, from manic-depressive insanity, or some other form of mental disease — that he may be hopelessly insane; but if any of the above questions are answered in the affirmative, he is usually convicted by the jury and sentenced by the judge. This means that we have made little progress since the Dark Ages when they used to tie the insane to the pillars of the church and whip them and beat them. Is there any one who has had the care of the insane that for a moment doubts that half or more of the inmates of any insane hospital know the difference between right and wrong, or that they are not amenable to punishments and rewards? And who has had any experience with the insane but has found many who would deliberately premeditate and plan for escape, for assault, or for another purpose? If this is true, then for every assault by one inmate which results in the death of another inmate or officer of a hospital, the offender should be taken out and tried for his life and executed, as much as the man in the community who is suffering from mental disease. And every insane patient who plans or premeditates to get the property of another, be it food, clothing, or something more valuable, should be immediately brought before the courts and tried in every case, because they are capable of premeditating, they are capable of planning, and they do gain by their peculations. Does this not mean that the medical man and not the lay jury should have the decision in cases of the mentally ill? The time is soon coming when society is going to wake up and realize that revenge does not get us very far, but that intelligent handling and disposition of the abnormal individuals in our community will be the solution of the question of the increase in both crime and insanity.

As I said before, the medical profession must stand firmly on the only ground it can occupy, and the law must yield to medicine and bring its rules into agreement with modern science.

The first step in this direction was taken last year by the Governor and Legislature of Massachusetts, when the following law was passed: —

CHAPTER 415.

AN ACT PROVIDING FOR AN INVESTIGATION BY THE DEPARTMENT OF MENTAL DISEASES AS TO THE MENTAL CONDITION OF CERTAIN PERSONS HELD FOR TRIAL.

Be it enacted, etc., as follows:

Chapter one hundred and twenty-three of the General Laws is hereby amended by inserting after section one hundred the following new section: — *Section 100A.* Whenever a person is indicted by a grand jury for a capital offense or whenever a person, who is known to have been indicted for any other offense more than once or to have been previously convicted of a felony, is indicted by a grand jury or bound over for trial in the superior court, the clerk of the court in which the indictment is returned, or the clerk of the district court or the trial justice, as the case may be, shall give notice to the department of mental diseases, and the department shall cause such person to be examined with a view to determine his mental condition and the existence of any mental disease or defect which would affect his criminal responsibility. The department shall file a report of its investigation with the clerk of the court in which the trial is to be held, and the report shall be accessible to the court, the district attorney and to the attorney for the accused, and shall be admissible as evidence of the mental condition of the accused. [*Approved May 20, 1921.*]

This law will, I believe, discourage the prosecution or the defence from employing paid experts. It will also save the State the expense of many trials and keep from suggestible readers the newspaper notoriety and details which are so vicious in their results. I believe few juries will seriously consider a paid expert's testimony when they have before them the report of a commission which, as part of its duties to the State, renders an opinion unprejudiced and unbiased.

At present there is no place to send the defective delinquents who constitute a large number of the recidivists in our State Prison and jails. Until the State provides a proper school for the education and improvement of this class, many of them will have to be sent to the prisons; but the judges and juries will know with what they have to deal and can handle these cases

more intelligently. Punishment, as Mercier says, in a moral imbecile arouses in him only a sense of injustice, of injured innocence, and of rank vindictiveness. He can never be made to understand that retaliation upon him is justifiable. With moral defects there are usually intellectual defects. The primary purpose of punishment is to inflict pain upon the offender in retaliation for pain he has inflicted. This is not appreciated by the defective.

THE HYPOTHETICAL QUESTION.

Now a few words on the hypothetical question and the uncertainty of verdicts with the prevailing practice of presenting cases hypothetically to the expert. To even an experienced expert they are often misleading. They are not supposed to be prepared even by experts. They are usually prepared by lawyers, who are not skilled in medicine and who know nothing of the disease about which they are talking. And if, in preparing the hypothetical question, the lawyer desires and commands skilled assistance, he has plenty of time to choose his words and dexterously combine them. They are then sprung upon the expert, who may have to remember a question of several pages in length, and is obliged to answer it by one word, yes or no. Could anything be any more unfair to the defendant or to the prosecution, or a greater travesty on justice? Let us hope that the hypothetical question will be ruled out of the courts of Massachusetts, as it has virtually been in some of the courts of New York.

Mr. Henry W. Taft of New York, on Jan. 13, 1921, delivered an address before the Bar Association on the subject of will contests and the legal and medical features connected therewith. In this address he made the following statements:—

The testimony of medical experts, so common in contested will cases, based upon hypothetical questions, is dismissed as not of a character to create an issue for a jury. In two cases in the Third Department, the Appellate Division set aside a verdict against wills based upon such evidence, and not only that, but ordered the wills to be admitted to probate; and this was done for the express reason that the issues should never have been allowed to go to the jury solely upon the testimony of expert witnesses. In a case which I tried within a few years, three of the most eminent alienists in this city had testified that the testator, who had suffered from a stroke of apoplexy indicating a lesion of the brain and had committed suicide, was incompetent to execute a will. The Surrogate directed a verdict in favor of the proponents at the close of the

contestant's case, which was unanimously sustained by the Appellate Division, without opinion. A motion made for leave to go to the Court of Appeals was denied, with this significant memorandum *par curiam*, that "if the Court of Appeals does not consider the law settled by its numerous decisions on the question of the 'degree of proof required to carry an issue of fact to the jury' application can be made to it to permit an appeal in this matter. We are satisfied that our decision was within the limits of their decision." The question of the sufficiency of proof to carry the case to the jury was thus with a faint trace of judicial defiance raised. The Court of Appeals did grant leave to appeal, but after argument affirmed the judgment, thus in effect deciding that the uncontradicted testimony of three eminent medical experts as to testamentary capacity did not rise to the dignity of evidence creating a conflict requiring submission to a jury.

In connection with the same subject, Mr. Taft made the following statements: —

An address on will contests would be incomplete without some observations upon the rules of evidence especially affecting them, and first I deal with medical expert testimony already alluded to.

The process of eliciting from medical experts answers to hypothetical questions concerning mental capacity has come to be a highly artificial and a wholly unconvincing performance. Both juries and the courts largely ignore such evidence, seeking for a basis for their deductions evidence showing objectively capacity of a testator to attend intelligently to his own current affairs. The refinements of the medical science, applied as they are to facts postulated in an interminable question prepared by counsel, interest them chiefly as intellectual gymnastics. They usually dismiss the learned medical disquisitions with ill-concealed amusement. Many years ago Surrogate Rollins said that an expert physician was called as a witness because his pre-ascertained views met the necessities of one of the litigants; and he added that the gist of the question propounded to them to establish insanity was, "If the person whose mental condition is the subject of inquiry is of unsound mind, is he sane or is he insane?" and that, on the other hand, on cross-examination the question asked by opposing counsel resolved itself into the interrogatory, "But if, on the contrary, this person of whom you are testifying is of sound mind, is he insane or is he sane?" This is now substantially the vice of courts. Thus the Appellate Division has held that "the proof of experts based upon a hypothetical question in opposition to proof showing . . . intelligence, scarcely, if at all, raises an issue for the jury." And the Court of Appeals in effect has held, as we have already said, that the uncontradicted evidence of three medical experts does not constitute a scintilla of proof requiring the submission of a case to a jury.

And so this kind of evidence has become an excrescence upon our court

procedure. This situation ought to be of serious moment to the medical profession, which may well consider whether its dignity and usefulness is not being impaired by the slight respect paid to views asserted to be based on established principles of the medical science. The juridical method by which courts seek to determine whether a man is competent to make a will is quite different from the theoretical process of the medical expert witness. It resembles more the process which alienists themselves adopt in examining a living patient; for they rely upon concrete objective symptoms ascertained by tests which experience teaches them to apply. In other words, they have a process corresponding to cross-examination, by which they seek to ascertain the truth. But medical men, testifying as expert witnesses, make deductions from assumptions embodied in hypothetical questions, being asked to accept statements of lay witnesses as to symptoms which in their day-to-day practice they would not think of accepting without subjecting them to the tests referred to. It is impossible for the medical profession by theoretical expositions to change the judicial process of investigation. It is too firmly imbedded in our jurisprudence. Furthermore, while it is not infallible, scientifically it is subject to less weighty objections than an investigation based on the artificial hypothetical question process. But whether it is so or not, it is certain that the conflict between the two methods is ineradicable; and the unfortunate condition remains that by the present system litigants are subjected to burdensome expense, and the time of courts and juries is unduly occupied with evidence which, in the main, is treated with scant respect.

At a meeting of the New York Psychiatric Society, on Feb. 2, 1921, Mr. Taft made an address bearing on the above issues, viz., the character and value of medical expert testimony, and the inutility of hypothetical questions. The matter was discussed by the society, and the general sentiment as expressed was to the effect that the hypothetical question was an ineffective method of bringing out expert evidence, and one which reflected discredit upon medical expertness and medical science generally.

The possibility of eliminating or modifying the use of the hypothetical question was discussed, and finally the matter was referred to the Committee on Medical Expert Testimony in Relation to Hypothetical Questions, who made the following recommendations: —

First. — The New York Psychiatric Society disapproves of the practice of using set hypothetical questions as a method of bringing out expert medical testimony.

Second. — The society recommends that the attention of the medical

profession, and particularly of psychiatrists and neurologists, be called to the above-quoted decisions of the highest courts which indicate that any evidence which physicians may give as experts, and which is based upon a hypothetical question, has not value in court, the consequence being that the employment of medical experts in cases wherein this method of producing evidence is used is a waste of time and money, and may involve to the physician a loss of dignity and self-respect. Specifically we recommend the subject be brought to the attention of the Medico-Chirurgical Association, the New York Neurological Society, and the American Neurological Association.

Third. — The society recommends that measures be taken to secure a joint committee of lawyers and physicians for the object of finding out whether any way can be devised by which medical expertness can be effectively used in cases in which an individual's mental and physical state cannot be determined by objective evidence furnished to the expert (provided this is not being done or has not been done).

FOCAL INFECTION.

BY J. F. ROCHE, D.D.S.,

DENTIST, MONSON STATE HOSPITAL.

Recognition by the superintendent of the appalling prevalence of dental defects, and the realization of their influence on the physical and mental condition of patients under his care at the Monson State Hospital, established the necessity of urgent attention to the question of having dental inspection of all patients at the institution.

About four years ago it became my happy lot to become associated with the Monson State Hospital as institution dentist, giving to same one day per week.

During my first year I extracted more teeth than I have during the last three years, because a systematic course of regular visits for fillings, cleansings and extractions has been adopted through close co-operation with the superintendent.

Investigations within the last few years by both dentists and physicians show without question that the greatest menace to the health of the human race to-day is to be found in the bad condition of the teeth of the majority of people.

The feeling is growing more and more prevalent toward saving the teeth — many times unfortunately for the patient, for teeth are treated, filled, crowned or bridged when probably close observation would show them to be the specific cause of ill health.

There are hosts of cases where infected teeth may not, and often do not, cause any symptoms which would lead one to believe that infected teeth exist in their mouth. This type of infection could be called chronic, since it does not cause pain, pus or swelling.

This is a bad type, since the patient has no symptoms which might direct his attention to this condition. The only answer to a question from a patient so afflicted is the X-ray, because a more general use of this procedure will reveal to the dentist, as well as to the patient, the existence of infected roots, when to the casual inspection the teeth may seem to be healthy and worthy of saving. This type of teeth should, by all means, be immediately extracted.

I contend this: no matter if the teeth give no trouble, or if one feels perfectly well at the present time, if he has had any dental work done at any time he should insist upon having his teeth radiographed so that he will not be a victim of false security and finally succumb to a fatal disease which could have been prevented had he taken the precaution mentioned.

Barker, at the Johns Hopkins Hospital, has shown that many cases of pernicious anemia have recovered when the infected teeth are extracted.

It has been shown that serious heart conditions, diseases of the kidneys commonly known as Bright's disease, diseases of the gall bladder, and many other diseases may be the result, directly or indirectly, of a focus of infection originating in the teeth.

Right here I might cite a case. A Miss B——, age seventeen, was forced to leave high school in November, 1919, due to an affected heart. On July, 1920, I removed what appeared to the eye a normal, well-filled molar tooth. The young lady returned to school in September, 1920, and is going on with her class.

The most serious results of infected teeth are to be found in the relation of this infection to nervous and mental conditions. For years specialists have been trying to find a cause for these unexplainable conditions.

It has been shown by authorities in State institutions that many patients afflicted with mental disease — which is supposed to be something apart from general disease — also had chronic infections of the teeth, and that the extraction of the teeth so diseased often brought about a cure.

By recognizing the fact that mental diseases may be the result of infection, and the toxæmia or poisoning due to this infection, those in charge of State institutions are able to restore many patients who would, with former methods of treatment, become chronic patients and remain in the hospital until time of death.

It occurs to me that superintendents of State institutions should insist that all patients under their care be rid of teeth having devitalized pulps. I have very clearly in mind a Miss S——, for whom I examined some teeth. I recommended the extraction of four. Her mother strenuously objected, taking the matter to the superintendent for adjustment. Dr. Flood, after hearing both sides of the story, decided in favor of extraction. All the teeth have not been extracted as yet, but marked improvement has been shown in the young lady's condition even after the removal of two.

Novitsky states, "On hundreds of devitalized teeth there was not one which, six months after devitalization, did not show unmistakable evidence of infection."

Rosenow has proven beyond a doubt that every dead tooth is infected, and he has obtained cultures from these teeth in every instance. Dr. Charles Teifer has ordered the removal of teeth which showed evidence of infection in the X-ray findings, and the apparently negative dead teeth were left in the mouth. The patients would be temporarily benefited, and, in some cases, greatly improved from the ailment from which they were suffering. Not, however, was there any permanent benefit until the apparently negative dead teeth were removed.

Occasionally apical infection may result after improper root canal filling, so called; but when infection occurs within a period of six months in practically every devitalized tooth, regardless of the fact that the root canal has been aseptically or anti-septically filled, many of which checked up with X-ray in the course of filling, it bears out my contention that no such procedure as "successful work" can be done. No matter what the technic may be, a vacuum will exist, and where there is a vacuum, there will you find infection.

Dental journals relate the name of a leading dental surgeon at the Vanderbilt Clinic who has had a very lucrative practice specializing in the operation of root amputation or apiectomy, and who has discontinued this line of work because he is firmly convinced this operation is of temporary benefit only, and the infection recurs in every instance.

Novitsky states, "No evidence has been introduced to prove that a devitalized tooth is not dead." The infection in dead teeth reaches its destination through the blood stream in a large majority of instances, while some infect by direct extension.

It probably could be inferred from this article that I favor the ruthless and reckless extraction of teeth. This, however, is far from my idea or practice. My intention is to try to show my reasons why teeth should not be treated.

Many times abscessed teeth are extracted, and little or no improvement is shown in the patient's condition because some infection may still be present. It is safe to assume, I believe, only temporary relief can be expected, unless, after extraction, the whole cause be removed by thorough and intelligent curetting of infected area.

Some patients who have had facial neuralgia or intense head-

aches, in which it was impossible to find the causative factor, have gained a cure by removal of necrotic bone-walled-off abscesses in which a root was contained.

At no time should good teeth be extracted, and, by good teeth, I mean teeth that are not hazardous to a person's general health. I still contend, however, that every tooth which has the pulp removed becomes infected after a period of a few weeks or months. These teeth then become a hazard. They should be sacrificed even though they show no outward signs of involvement or cause any definite ailment.

It is estimated that in the United States in the year 1916 the total number of deaths caused by tuberculosis was 101,396. The total number of deaths caused by heart disease was estimated to be 182,850 for the same year. I do not say that all of these deaths from heart disease were caused by infected teeth, but I think it a fair assumption to say at least 70 per cent were sent to an untimely death because of tooth infection.

Some four years ago a young man was presented to me at the Monson State Hospital for examination. I was unable to locate any wisdom teeth on the lower jaw. Assistant Superintendent Dr. M. B. Hodskins took an X-ray of the area where said teeth should be.

The print showed an impacted wisdom on either side. I extracted these teeth forthwith. Ten days after the operation the young man was discharged from the institution, and, as far as I know, has not had a recurrence of epilepsy.

A little Miss M—— was presented to me for examination. I recommended the extraction of what looked to me to be four diseased six-year molars. I received permission to extract, and to-day, after three months, she is still free from any spells of either epilepsy or hysteria.

There are medical men who have gone so far as to say that no case of chronic appendicitis should be operated upon until an effort has been made to find the source of the irritation. The same men say that this applies to non-toxic goiter and gastric ulcer. Their claim is that many of these cases are benefited or cured by the removal of infected tonsils or infected teeth.

Once more I wish to say that I believe no dentist is prescribing wholesale extraction of teeth as a specific cure for mental and nervous diseases; yet I personally feel much improvement can be brought about by close relationship between the dentist and physician.

To help bear out, in a way, the strength of my conviction, I will recite a case appearing in a recent magazine over the superintendent's signature.

Decay of anchor teeth, which released a heavy bridge, causing it to fall from the mouth, has restored the sanity of a woman confined twelve years in Wanwatosa Asylum as hopelessly insane. The woman was released from custody recently. "The case is one of the most remarkable which has come under my observation," said Dr. W. F. Bentler, superintendent. "For twelve years the woman, whose name we withhold out of consideration for her future, had been confined in the disturbed ward because of her tendency to become violent. She gradually grew worse, giving the guards constant trouble. From the moment the bridge fell out her mind began to clear. The improvement was so marked and unmistakable that we are certain it is permanent."

THE EDUCATION OF THE EPILEPTIC CHILD.

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I feel rather proud of our Massachusetts institutions for the care of the needy ones of the State when I compare them with those of some other parts of the country. In this land of mountains and valleys, sunshine and flowers, when asked about Massachusetts State hospitals, I am glad to be able to say that the epileptics are housed and cared for in a hospital set apart and equipped especially for them.

I visited Agnew a few weeks ago. It is a handsomely built, well-conducted hospital for the insane of California, where a few epileptics are admitted. The officers held up their hands when the latter class of patients was mentioned. They considered them the more difficult to care for in every way.

I have been asked if epileptics can be educated — if a school in a hospital for epileptics is worth while.

“No,” if you expect results similar to those of schools for normal children; “Yes,” if one looks for definite, permanent improvement and the prospect of seeing pupils made self-supporting and able to get along as does the normal worker.

Of course, epileptic children who remain for treatment at a State institution are not normal, or very rarely so. They are of all degrees of intelligence and unintelligence, from the helpless demented who can only be taught to swab, to the child who is not much clouded mentally, has infrequent convulsions with brief after-effects, and who does not show progressive deterioration. We might call this the first class of cases, the swabbers the third. There are only a few boys and girls who belong in the first class in a colony of epileptic children. These few seem to hold their own against spells, and one has hopes that they will be able to return to family and community life eventually, with some chance of seeing the hopes realized. These repay the time and work of nurse, doctor and teacher, and it is certainly gratifying to send back to normal life, as a useful, self-supporting and self-respecting citizen, one of this pitiable class of patients.

Those who form the middle class, and less intelligent than the

first, are open to suggestion, and teachable, as far as their mentality allows, but the recurrence of convulsions clouds the intellect for hours, days, at times for weeks, and perhaps is the beginning of the steady downhill road to permanent dementia.

In some of these cases there will be a gain for months, then a short period of loss, following convulsions, later a catching up of interest, and more progress, this repeated again and again. Many who attend school belong to this class.

Others, having frequent attacks of petit mal just manage to keep on with lessons, and then, unless there is a remission partial or complete, show growing dementia, and, losing their grip, drift toward the third class. Or any one of the middle class may keep on for years, gaining and losing, alternately, to have a dropping off in the number of convulsions, and a more hopeful outlook for the future.

This middle class furnishes useful workers, but they rarely have enough initiative, or power of application, to do anything except routine work under supervision.

In a school for feeble-minded, where there is no complication of epilepsy, pupils may be taught certain things, and what is once acquired by them will probably be retained and made the groundwork for future gain, but the fact of epilepsy makes it problematic that any gain be relied upon, and therefore teaching is quite a different matter when there are feeble minds plus epilepsy. The outlook is much less hopeful for the pupil, much less encouraging for the teacher.

This is the outline, in the main, of the question — very discouraging when considered from the viewpoint of ordinary critics. But when the question of school is considered as to its bearing on the running order of the hospital — its psychological effect, its value can hardly be overestimated.

The helpful, stimulating, pleasurable influence that a well-conducted school has among children is a very necessary factor if one considers their happiness and well-being, and in Monson State Hospital the happiness of patients was made an important part of their treatment when I was there (1912-18), and I am sure it will be as long as Dr. Flood and Dr. Hodskins are at the helm. I recall the most excellent school at the Children's Colony; the strong moral influence of the teacher; the well-organized day's routine; the music in which the whole school took part, or tried to; the special lessons on the piano for those who showed any talent; the three R's from the school books;

the little plays which much drilling brought through very acceptably; the recitations; the regular hours devoted to arts and crafts. Any one who showed talent or aptitude for some particular form of study or craftsmanship was instructed and encouraged along that line. There were gardening and carpentry and other useful kinds of work for the boys. The girls were taught to make garments for themselves. Newspapers were placed where the more intelligent pupils could use them freely, and always there was the upholding of good standards in dress and deportment.

All these activities and influences put into the average life of a child in an institution make the difference between dull, dreary routine and the inertia which so easily besets the epileptic, and a life of variety and pleasant effort under an appreciative leader and friend. A real teacher should be a friend also.

And to me it is eminently worth while, and a school is a necessary part of the treatment and care of epileptic children in a well-organized hospital.

I will conclude this discussion of the question of education for epileptic children by repeating my former reply: Is it worth while? "No — yes," with emphasis on the "*yes*."

FACTITIOUS DERMATITIS.

BY DAVID E. HARRIMAN, M.D.,

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Whenever a dermatologist is honored by an invitation to write a paper relative to his specialty he immediately considers the question of eczema. This is at once a convenient and compatible consideration, because a dermatologist (or any one else) may write a paper on eczema that will not only place the writer in a satisfactory and unassailable position as to etiology and cure, but it gives the reader the rare opportunity of nodding over a medical paper without the usual uncomfortable feeling that he may be overlooking something worth while. The fact that dermatology is generally considered to be something of a medical grab bag should lead an occasional thinker to consider that one might put his hand into this grab bag and extract a refreshing something that is not eczema.

Dermatology is primarily a specialty of observation but, like the internist, the dermatologist must observe and speculate as well. Speculation in medicine is, unfortunately, intimately associated with the foundation rather than the superstructure of diagnosis, and the internist must speculate on what is unseen while the dermatologist speculates upon what he sees. Again, the internist may nourish the fond hope that he has cured an internal condition, and may instil such a belief into the mind of the patient, but the dermatologist is not misled by any such comfortable illusion because the condition is open to view and discussion, academic or otherwise, to the physician, the patient and the interested bystanders.

The dermatologist must learn to read the story behind the lesion, the correct reading of which too often engenders despair of a cure. The most evident if not the most common point of contact between the neurologist and the dermatologist lies in the condition known as dermatitis factitia, or dermatitis artefacta, and while the condition is described as dermatologic, it really belongs in the realm of the neuropsychiatrist.

The bibliography on the subject is not voluminous, doubtless because the incidence of the condition is commonly supposed to

be an exhibition of malingering, and medical men are likely to make short shrift of a malingerer.

The subject, under the caption of "neurotic excoriations," was thoroughly and interestingly covered in articles by Drs. McKee, Pusey and Senear in the "Archives of Dermatology and Syphilology" of March, 1920. These two articles are quite complete, and the types of cases are carefully and satisfactorily illustrated.

Generally considered, dermatitis factitia is a condition of the skin induced by an irritant or traumatism. This is done by the patient to excite sympathy, and this alone designates the type of such a patient. The lesions produced are naturally dependent upon the irritant employed, and because of this nearly every type of skin lesion may be simulated. Naturally the location of the lesions is the first diagnostic consideration, for the abused portions of the skin must be readily accessible. Ordinarily the left side of the body shows the greater number of lesions because most people are right handed. The lesions are multiple and disposed asymmetrically, — another evidence of artefaction. Like real criminals, it is rare for these cases scientifically to cover their tracks.

An accusation that the condition is self-imposed is likely to be productive of indignant and self-righteous denial, and leads inevitably to one of two dispositions of the case, — either the patient acknowledges the act and discontinues it, or goes to another physician who receives the credit of the cure.

It is not, however, the foregoing phase of this condition with which this paper concerns itself, but with a phase that leads the innocent dermatologist into the sacred and well-tilled field of the neurologist, or, to speak properly, the psychiatrist. This particular phase of factitious dermatitis amounts to a traumatism of the skin which the patient is impelled to do because of a fixed idea, and beyond mentioning the term "fixed idea," no self-respecting dermatologist would venture into neurological terminology. It is intimately related to the sensory neuroses of the skin which exhibit themselves in cases of oöcorophobia, formication, burning points on the skin and mucous membranes, and which to the distressed patient mean that cancer is certainly impending.

The common "fixed idea" in this connection is that there is some indefinite sort of germ or worm in the skin which must be removed. The patient tells you he finds a little lump in the skin under which he knows there is a worm. He digs at the

spot with his nails, excoriating the upper layers of the skin until he finally extracts a bit of tissue. Oftentimes one such operation does not fully relieve the mind of the patient and he then repeats it. Finally the spot is allowed to heal and, owing to actual tissue loss, it heals leaving a scar. This process repeated a sufficient number of times will scar a face badly, but the scarred skin is, to the patient, only a battlefield upon which signal victories have been won.

In the cases which have come to the attention of the writer the lesions and scars were situated upon the cheeks. Presumably this is due to two reasons: accessibility, and that necessary but pernicious toilet accessory known as the mirror. A man who shaves each day examines his face with more than indifference, and a woman can usually see in her mirror a reflection that is subjected to intense scrutiny, and an offending blemish becomes the starting point of a veritable dermatologic inquisition.

There is no pathology of the skin in a dermatitis factitia. The pathology exists in the brain of the patient, and there is scarcely more sense in treating the skin of a factitious dermatitis than there would be in treating locally the legs of an ataxic patient.

Three or four cases briefly cited will serve to illustrate the difference in the type of cases:—

B. S., a high school girl seventeen years of age, was brought by the school nurse for advice regarding a distressing eruption on the arms. The girl was keeping house for her father and three children younger than herself, and trying to keep her school work along. Because of her efforts in this direction she had enlisted the sympathies of her teachers and the school nurse particularly, when an eruption began to appear on her arms. The eruption required a dressing each day by the school nurse, and finally the case appeared in the office of the writer. Both arms were carefully bandaged to the elbows. The eruption was palpably a neurotic excoriation evidently accomplished with something that burned the skin. After an explanation of the etiology to the nurse she was impressed only by the incorrectness and unsympathetic diagnosis of the condition, but agreed to follow the directions given, with unbiased opinion. She was soon convinced that the diagnosis was correct, and then the patient was frankly told the truth. She was not seen again, for obvious reasons, but frankness on my part allowed her to go to another physician who won distinction for himself and contumely for me

by effecting a cure. This, however, was quite worth while in the interests of the girl. This case was not of the fixed idea type, but the condition was induced solely for the purpose of securing attention and sympathy, and the motive being exposed the condition ceased.

Of the other type which is governed by a fixed idea, two cases have attracted my attention. One, Miss C., was a very fine looking and appearing young woman, a public singer and accordingly (or therefore) temperamental. There was a history of an attack of facial impetigo two or three years previous, and the fear that it had never completely disappeared impelled the patient constantly to prick the skin and make unsightly excoriations.

A second case of this type was that of a business man about forty-five years of age who had excavated and excoriated his face for years because of some "germ" which he was continually impelled to eradicate. His face was badly scarred from the process. He frankly admitted that he could not control his inclination to abuse his skin. He was intelligent, and therefore the subject was gone over with him. He agreed that the cause existed in his mind, but questioned his ability to overcome the habit. This case was lost sight of.

Another interesting case which was seen by one of my confrères was that of a young woman who applied to him because of a sore underneath her tongue. Upon examination he found a lesion that was pathognomonic of nothing. She had previously told him of a sore eye which before a cure was effected had required hospitalization and the care of a surgeon. The physician asked her if by any chance she herself had made the sore under the tongue. She became confused for a minute, then freely admitted that she had had for a long time an uncontrollable impulse to press her finger against that particular place on her tongue, and that by so doing she had produced the lesion. The doctor then asked her if she was also responsible for the eye trouble of which she had given the history, and she admitted that such was the truth. She had the same impulse to press her finger against her eye, at first outside the lid; later she was impelled to raise the eyelid and press against the eyeball, and this resulted in excoriation and an ulcer which resulted in her hospitalization.

Obviously the treatment of this type of case should fall to the lot of the neuropsychiatrist, and therefore I pass along to him the honors to be earned in this field.

COMBINED PSYCHOSES.

BY R. A. GREENE, M.D.,

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Kraepelin, in his eighth edition, volume 1, speaks of his having observed quite a few cases of combined psychoses, particularly of one endogenous and one exogenous appearing together, referring particularly to alcoholic psychoses, dementia præcox, or other disease superimposed upon a feeble-minded basis. He states, however, that he has observed a few cases of two disease entities existing in an individual, such as manic-depressive psychosis and epilepsy.

I wish to report two cases, one of the type in which there is evidently a combination of manic-depressive psychosis and epilepsy, the other a case that is apparently dementia præcox and epilepsy.

CASE 1. — E. H., No. 412, female, aged sixty-seven.

Family History. — Father died of apoplexy; mother of epilepsy.

Personal History. — One convulsion in infancy. Received good education, became a teacher. Convulsions began, or returned, at the age of eighteen. Seizures infrequent and often nocturnal until time of admission, November, 1900, at age of forty-six.

Hospital History. — For two years patient presented characteristic symptoms of epileptic syncrome, averaging about two convulsions a month. In 1902 she had a short period of depression, followed by a period of exhilaration and general feeling of well-being. In 1903 patient exhibited symptoms of renal disease, increased amount of urine and presence of hyaline casts.

In 1910 the record again refers to a short period of depression. In 1911 another period of depression which was rapidly followed by a period of feeling of well-being and elation.

In 1912 periods of depression are noted three times in the same year.

In 1913 patient had a period of depression lasting for three months in which she exhibited agitation, distrust of relatives and physicians; did not take nourishment well, and frequently refused to believe her brother had any interest in her, although she usually had utmost confidence in him. This condition suddenly changed in twenty-four hours to one of elation and approximated normalcy, except that patient was overactive

and exhibited undue interest in trivialities, exaggerating the importance of her duties about the ward or cottage where she lived. In this year patient is recorded as having but one seizure, and that of petit mal type, several months after period of depression had passed.

In 1914 and 1915 patient had no seizures, but did have prolonged periods of depression in which she expressed the desire to die and threatened to kill herself. Was always very religious, and stated that only her faith and religion prevented her from doing so. One period of depression lasted five months and ended abruptly. Patient greeted physician on morning visit with the statement that she had been awake nearly all night on account of the great relief and happiness at having gotten over her terrible experience. Felt very happy and cheerful, full of energy and animation and elation. In this two-year period had several similar attacks, not as long in duration, but during one injured herself about the head and extremities in an attempt to relieve her agony of depression, and on one occasion attempted to throw herself down a flight of stairs in suicidal effort. Had the delusion of unreality — that she was not like any other person, was not of this world, was not born, and would not die. For hours and days would remain with hands clasped so tightly or holding her chin and cheek until discoloration and indentations from pressure appeared, in the agony that she was not of this universe, and agony and anxiety as to the outcome of her future, with no hopes of Heaven.

In 1916 patient had but one seizure. In 1917 had only two. In this period had one attack in which she was markedly manic, constantly in motion, destructive, would not wear clothing, would not allow her hair or person to receive proper attention for necessities of cleanliness. Recovery was rapid, and allowed again the privilege of open ward.

In 1918 and 1919 she had but two seizures, alternating between depressed and hypomanic states. Resided in open and closed wards alternately, threatening suicide frequently in her periods of depression.

Since November, 1919, to present time patient has had no convulsions, and when not depressed has had periods, sometimes lasting two or three months, in which she is elated, shows psychomotor activity, constantly working, distractible and making much out of little; her activities great and accomplishments small, but cheerful and in happy frame of mind.

In this case, since 1903, there has been constantly an excess of urine in amount, low in specific gravity presence of albumen or casts. Periods of having oedema of lower extremities, with evidence of loss of compensation of cardiorenal type.

This case has presented typically, at different times, the reaction of the epileptic syndrome, with egotism, selfishness, convulsions, religious ideas and deterioration. She also has shown the typical reactions of manic-depressive psychosis of the mixed type.

CASE 2. — G. F., No. 6958, male, aged thirty-eight. Diagnosis: dementia præcox, hebephrenic.

No history of family, birth or infancy. Nothing known of childhood or early adult life. Admitted to a State hospital at age of twenty-seven, under conditions indicative of having escaped from some other institution by reason of various marks on clothing and statements he made, but this never confirmed.

Physical examination negative. He remained in this hospital nine years before commitment to Monson State Hospital, having in this period constant symptoms of incoherence, irrelevance, exhibiting mannerisms and hallucinated. He used coined words and uttered senseless combinations of syllables. For example, "I was not born." "I was made out of sand, iron or copper." "I have no father or mother." "I'm a pharmacist." "My name is Sherman." "I was born in New York State, a pupil of Catarangus University." "I got the rubber boots at Davenport Insane Hospital."

This condition continued for four years when there was reported an ill-defined seizure by the attendant. A year later patient had two seizures; the next year, 1912, one seizure; and in 1913 had two seizures which were witnessed by a physician and considered epileptiform. Following this he had convulsive seizures at varying periods until December, 1914. From then to August, 1915, he had none.

Admitted to Monson State Hospital August, 1915; case left undiagnosed. Remained until his death, Dec. 3, 1917; cause, pernicious anæmia. He had in all, thirteen convulsions at varying intervals of three to six months, having five of these in one month. His reactions were typically those of dementia præcox. He was boisterous, noisy, profane, obscene, incoherent and irrelevant. Extremities cyanotic. Constantly played in water. Replies to questions were profane irrelevances or stock phrases, such as, "Russian snow banks," or "C. F. Brown's drug store."

This case seems to be an example of combined dementia præcox and epilepsy. Of course, this may be a case of dementia præcox with convulsions, which the literature describes as of more or less common occurrence. I have, however, in my experience seen but one other case, and the convulsions in this case occurring so late in life, and in the disease, that they might readily be explained as uremic. Both cases to my mind but increase the evidence of the futility of making a diagnosis of epilepsy *per se*. At best epilepsy must be considered a syndrome, and the occurrence of so-called idiopathic epilepsy is so rare as to make me feel that all convulsive conditions are an evidence of lessened inhibitory control in the central nervous system, or lack of resistance on their part to many and varied stimuli or irritants.

BEGINNINGS OF A NEW DEPARTURE IN SEX THOUGHT AND ACTION.

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Twenty years ago, or ten even, nothing would have persuaded me to write this little article. I should have been perfectly willing, so far as I myself was concerned, but I should have feared that, with the traditions then extant, and with the then inflexible public conscience, the general knowledge that so pronounced a liberal, or possibly radical, was in any way concerned with an institution which is still dear to me, or was in any way associated with its friends and sponsors, might have reflected unfavorably on it and them.

To-day I have no such fears, for the time at last has come when whatever difference there may be in individual opinion as to details, every scientist who respects fact, every savant who has vision, every intelligent, educated or sensible man or woman recognizes the acute necessity of intensive investigation and frank discussion of the cardinal facts of sex.

Really, in those former days, had any sort of tradition been in vogue, no blame could have been attached to the officers for harboring me in the aforesaid institution, for none of them knew for many years that I concerned myself more than the ordinary man with the subject of sex.

I came to the Hospital Cottages thirty years ago as a graduate in medicine without a diploma, my medical studies having been completed in less than the four-year period required. Hence, my relations with the then superintendent, Dr. Flood, were at once those of student, assistant, and, I am proud to say, almost immediately as friend. I served as assistant for a time, as acting superintendent during his year abroad, and again as assistant after his return. During this time, and for nearly twenty years after, though we pursued some studies involving the circumcision or castration of the unfit, and though we mutually deplored the probability that, under existing conditions, many of the certainly unfit would grow up and surely propagate their kind, I never alluded to my growing interest in sex investigations.

At first my interest was largely a personal or a family one, for I was married before I studied medicine, and had four small children before I definitely left the hospital employ. As long as my interest was purely personal in these subjects, I was ashamed to mention it, and when it assumed a social significance and became, in a measure, a desire to clear up some of these mysteries, and to help others to a saner way of living, I was too wise to mention it until I had as a background a body of evidence, and was fairly sure of my ground.

Nevertheless, the definite beginnings of my sex studies date from those years of early married life, of intense application to medical studies and work, and to that period of intimate and constant contact with epileptic and otherwise nervously unstable youth.

In those days pretty nearly all medical textbooks which made any reference to the subject stated unequivocally that there was a definite masturbatory insanity; that masturbation was the usual, frequent or sole cause of epilepsy. It was the popular belief, founded to a large extent on medical authority, that idiocy, imbecility and all kinds of mental degeneracy were in some way attributable to this then-thought chief scourge of man.

As I have mentioned in my books, I was pretty busy during these years, thinking out and working out the sexual problems that a totally unversed young man must face in early married life. I first read what I could get hold of, which was not much; then, possessing in some slight degree the faculty of observation, I began to observe what was going on around me, and to reflect upon the same.

Here, in the hospital, we had some sixty epileptics, supposed to range in age from one year to fourteen years, though a few older ones were present who had grown up with the institution. The records showed that some of these began to have seizures in infancy, and practically all of them before the sixth year. Observation revealed that practically none of them indulged in masturbation before the sixth year, but that almost invariably the practice was begun at about this time, or at some time during the two or three years next succeeding.

The books said that masturbation produced epilepsy, and therefore must precede it, but this was not so, since epilepsy almost invariably preceded masturbation.

Of course there was still the possibility that epilepsy in the child resulted from masturbation in the father or mother, but I

soon dismissed this possibility, for I had then already learned enough about the universality of masturbation in the youth of both sexes to realize that if epilepsy were a hereditary result of it, all the world would be epileptic.

The same phenomena observed in epileptics were observed in those children suffering from antenatal or birth palsies, and in organic nervous diseases resulting from the acute diseases of childhood, as well as in those born with varying degrees of nervous instability. So far as could be learned, instability or disease preceded masturbation. On the other hand, in spite of all attempts at deceit or falsification, normal children were found to be generally addicted to the same practice, though it was begun later, indulged in less frequently, and universally denied, especially in the presence of grown-ups.

It soon became apparent to me that at least a portion of the few observations made by medical and other scientific men in the sex field were superficial, and that the statements in the literature based on these observations were false.

There were at least two good reasons for these hasty deductions from incomplete and superficial investigations: first, the scientific and lay minds had been so influenced by the traditional, lurid pictures of the dire results of any erotic feelings or expressions, particularly of auto-erotic fancies or expressions, that every one was prepared to attribute every disease and every misfortune to such sex activity, without taking the trouble to differentiate normal from abnormal expression; second, it was comparatively easy to observe that epileptics, insane and feeble-minded masturbated regularly or excessively, since the traditions which developed shame, fear and secrecy in the normal youth had slight or no influence on these classes. Hence the practice was followed openly, without attempt at concealment. The same traditions caused the normal young person, or adult, for that matter, to conceal and deny any such practice.

With the medical mind already prepared for serious results, it was easy to assume that, since masturbation was universal in those of limited mentality, and since ordinary methods of investigation had failed to disclose this, to any extent, in the mentally full-fledged, its presence in the former class determined their disease and instability, and its absence in the latter class was a sufficient reason for their normality.

I then set about to find out if masturbation was generally

present or generally absent in normal youth. My own experience, schoolboy tales and drummers' yarns had led me to believe that this and other sex practices were much more prevalent in the normal youth of both sexes than had been generally believed.

My subsequent discovery of the practical universality of this at one time or another in the lives of boys and girls and men and women, from an extended observation of the best educated and most moral and most successful of apparently normal people, as well as from the study of neurotics, who, as a class, I came to believe to be transient deviations from the normal, and my deductions from these facts, and my other conclusions from incidental and purposeful studies of the sexual lives of men and women, are fully given in my books, and need no further reference here.

I merely desire to call attention to the humble, timid and inconsequent beginnings of studies, the results of which ought to have been obvious many years earlier, — studies which I hope have in some measure helped to promulgate "A New Departure in Sex Thought and Action," a departure which has, at any rate, taken place, whatever the source.

This work was begun in this country, as stated above, in 1892, some two years before Breuer and Freud, in Vienna, made their first classical investigations of hysteria.

While Freud's work was later destined, in spite of much hasty deduction, from theories based on inadequate facts, and in spite of some unwarranted assumption, to revolutionize neurological diagnosis and treatment, and to influence widely all sociological thought for all time, mine, while receiving no such notoriety, or being the subject of any general acclaim or rancor, has possibly done something to corroborate some of his most important findings, and possibly something toward disproving some exuberant Freudian claims.

I feel content with the thought that it has perhaps opened the eyes of many to the normalcy, legitimacy and beauty of sex when properly understood and intelligently made use of, and that many who have suffered needlessly from the phantasmagorical terrors inspired by lurid tradition have found self-condemnation unwarranted, and fears groundless. At least, some terrors have been abated, some conflicts between instinct and convention have been reconciled, some so-called moral issues have been legitimately disposed of.

Finally, there is the hope that the rising generation may grow

into strong, happy, loving, industrious, Christian men and women, *sans* the shame, terror, dread and humiliation of the generation which preceded it.

Another contrast with Freud's work is that his valuable discoveries, together with his flimsy theories, were given to the scientific world in an uninterrupted stream of publicity from their first inception. Consequently much contradiction has resulted, and much restatement has been necessary.

My own studies, while beginning in a limited way at the age of twenty, may be said to have begun definitely at twenty-five, during the period to which I have alluded; but I did no writing along this line until I was over forty, and my first book was published when I was fifty.

I, like all the rest, was afraid of the whole subject. Later I tried to "make assurance doubly sure" by locally putting in practice my conclusions before giving them to the public. I feel that I have been well rewarded, since (unless at this late day, after my books have had ample opportunity to provoke protest, some avalanche of opposition yet o'ersweeps them) the violent and virulent criticisms may be numbered on the fingers of one hand, and those that were all are forgivable, since they are the last departing flickers of the flame of tradition which has hampered and circumscribed all sex thought, study and expression for twenty centuries.

In closing I cannot refrain from saying that my chief and teacher with whom I was most intimately associated in the early days above depicted, though he knew absolutely nothing of my burgeoning thought and work in this field, was an unfailing source of inspiration to painstaking research and tireless effort.

A most efficient teacher, a faithful friend, a monument to ceaseless labor and unflinching integrity, his was a devotion to suffering humanity, particularly to youthful humanity, rarely if ever surpassed. No one could have been better chosen than he for his particular field, which his labors, now ripe after forty years of selfless, efficient, unceasing devotion to the State and its unfortunate children, fully reveal.

May the Lord spare him long and prosper him much on the rest of his journey, and may the State and society be fortunate enough to secure one who may in some degree approximate to his unique ability and tireless devotion when he lays down his public labors.

SURGERY AT THE MONSON STATE HOSPITAL.

BY JOHN M. BIRNIE, M.D.,

CONSULTING SURGEON.

For the past five years I have been officially connected with the Monson State Hospital as a member of the surgical consulting staff, and previously I was conversant with the surgical work conducted in this institution.

Of course, there is no real surgical treatment for epilepsy, but it is generally conceded that any bodily or mental irritation which might cause attacks should be removed, and it is by this principle that we have been guided, to some extent, in our work at Monson. We believe that any anatomical lesion or improperly functioning organ should be removed or corrected, and that this correction should be exercised through proper treatment, be it medical, Roentgenological, surgical or otherwise. We believe that all our patients should have the advantage of being placed in as perfect a physical condition as possible. In addition to this phase of the work, one must remember that an institution housing some 1,500 persons, either patients or employees, corresponds to a community of similar numerical population. Surgical conditions resulting from accidents and the ever-present cases of appendicitis, gall bladder diseases, etc., require attention. For obvious reasons it is impracticable to transfer our patients to the general hospitals, and therefore we must bring the surgical hospital to them.

Dr. Flood has always believed his patients deserving of the best care which could be afforded through personnel and modern equipment, and has earnestly striven to equip his hospital with every facility. The idea of creating a consulting staff embracing various lines of medical activity originated with Dr. Flood, and, having been established, he has striven to provide it with the necessary physical equipment.

The hospital has an excellent laboratory and an up-to-date X-ray equipment. There is an excellent operating room thoroughly equipped, and the necessary instruments are available and kept in excellent condition. The sterilizing outfit is operated

by electricity and is most compact and efficient. The facilities available for proper surgical diagnosis and treatment are superior to those possessed by many hospitals serving a much larger community. As our knowledge of the treatment of epilepsy advances, if it be shown that surgery can materially influence the course of the disease, the Monson State Hospital is in a position to avail itself of such therapeutic aid.

Our work has only started, and we have many problems to solve, but the future promises a field of greater activity.

AN INSTITUTE FOR THE STUDY OF CONVULSIVE PHENOMENA.

By D. A. THOM, M.D.,

FORMER PATHOLOGIST TO MONSON STATE HOSPITAL; CHIEF OF THE OUT-PATIENT
DEPARTMENT, BOSTON PSYCHOPATHIC HOSPITAL; INSTRUCTOR AT HARVARD
MEDICAL SCHOOL.

The present-day neurologist and psychiatrist interprets epileptic manifestations in terms of some underlying pathological process which affects either directly or indirectly some portion of the nervous system and results in either loss of consciousness, convulsions or both. The pathological process may be going on in the kidney, heart, pituitary, gastro-intestinal tract, blood or the brain itself, which may be affected by a definite traumata, tumor, meningitis, etc. A brain ordinarily considered normal will react in a most extraordinary way while being nourished by lymph which is rendered toxic by the absorption of alcohol. The *spirochæta pallida* or typhoid bacilli, as well as the staphylococci and streptococci, also exert an influence that needs hardly to be mentioned.

In fact, an apology for all the foregoing would be in order were it not that so many of the recent contributions to the subject are ignoring the fact that there is still a certain amount of anatomy and physiology of the human body worthy of consideration, and that there are more logical ways of explaining epileptic manifestations than as a wish fulfillment on the part of the individual "to make way with an intolerable adjustment demand."

The wards and laboratory of the Monson State Hospital have contributed generously and wisely to the literature on this subject, and to Dr. Flood much credit is due for opportunities and stimulation to carry on research problems by the different members of the staff. Still, there remains much to be desired in the examination and study of the group of convulsive disorders where the underlying pathological conditions are so numerous and varied, yet in early cases so frequently amenable to therapy.

One's attention is drawn in a most optimistic way to the results of therapy obtained in the out-patient clinics, due to the

fact that cases come under observation and treatment at an earlier date. On the other hand, in reviewing the 1915 report of the Monson State Hospital, I find that the average duration of the disease before admission to the hospital for that year was 13.37 years, and that of the population in the hospital during the year 1916, 90 per cent were either feeble-minded or demented, and less than 2 per cent were of normal intellect.

Imagine for the moment the hopelessness of the situation if the cases entering general hospitals for diseases affecting the heart, kidney, lungs or any other organ were of thirteen years' duration.

The State of Massachusetts needs an institute where early cases of conduct disorders may be sent and thoroughly studied in an attempt to determine the factors that are either present or absent which account for the convulsions and other associated phenomena.

Laboratories which would furnish all available information which our present knowledge of biological chemistry, basal metabolism, clinical pathology, bacteriology, as well as the X-ray, should be established, equipped and utilized. The staff should be sufficiently large to permit a careful detailed study in every individual case. There would no longer be the blanket diagnosis of epilepsy, or at least it would no longer be considered satisfactory, and treatment would be directed along scientific lines rather than the imperial manner now in vogue. The results, I am sure, would justify any expense such a plan would entail. Many individuals would be saved from a life of social incapacity and economic dependency.

An acute receiving hospital is an absolute necessity to such an institution as Monson. It is impossible to do medical justice to the patient with less laboratory equipment, and workers to operate the same, than I have just outlined. There is a large and hopeful group of individuals suffering from convulsive disorders which Monson is totally unequipped to care for under the existing conditions and organization. This need should be met by a new receiving hospital.

The staff should be made up of specialists in several branches of medicine, — neuropsychiatrist, internist, surgeon, pathologist, chemist. Some of these, of course, could well be visiting men, but with definite obligations to the institute. It is astounding, indeed, when one considers the amount of money spent in the custodial care of those incapacitated by reason of mental defects,

how inadequate are the provisions for studying the cause and means of prevention. Even here in Massachusetts, where generosity abounds when it comes to providing food and shelter, over eight millions of dollars being spent annually on the care of the mentally sick, comparatively little is expended on prevention and research. Consequently our problem is increasing in complexity and magnitude.

It is over forty years since Jackson called attention to the fact that epilepsy like aphasia was being studied "with a psychological habit of mind." He also noted at this time the unfruitfulness of such efforts. In view of our past experience one cannot feel that psychotherapy is more potent to-day in combating organic disease than it was in Jackson's time, but we have advanced in our knowledge of internal medicine, surgery, bacteriology, endocrinology, etc. So in the same measure should we have advanced in our knowledge to determine the underlying pathological factors of which convulsions may be considered but a symptom.

I no longer believe that epilepsy as a disease is handed on from generation to generation, and the recent hereditary studies carried on at the Monson State Hospital bear out this conclusion. Rather would I believe that the individual with an unstable nervous system passes on to his progeny a nervous system of a similar kind which may manifest its instability in a variety of ways when subjected to undue physical stress or mental strain. Convulsions are only one of these manifestations. It seems particularly important just at this time, when the psychogenic theory of epilepsy is being advocated by a large and ever-increasing school of Freudian adherence, for those of us who still believe that anatomy, physiology, internal medicine, endocrinology, bacteriology, etc., may be utilized in interpreting signs or symptoms revealing pathological conditions, to renew our efforts in behalf of those afflicted with a disorder whose manifestations are so overwhelming, the prognosis so grave, and the end so hopeless as those we have been considering.

THE TIME ELAPSING BETWEEN ONSET OF EPILEPSY
AND ADMISSION TO THE HOSPITAL IN 119 PA-
TIENTS AT THE MONSON STATE HOSPITAL.

BY PETER P. LAWLER, M.D.,

ASSISTANT PHYSICIAN, MONSON STATE HOSPITAL.

These 119 patients were selected out of our 1,000 patients because this article was written in conjunction with another article which deals with all the married patients in this hospital with offspring. These 119 patients are married and have one or more children, so perhaps they should be expected to have a longer pre-hospital period than unmarried patients. The average pre-hospital duration of epilepsy in these 119 patients is 17.4 years, and over 90 per cent of them received little or no treatment from the time of onset until they entered this hospital.

What will you say of the prognosis in these cases? It is definitely known that epilepsy must be treated early to effect a cure. Many concrete examples are given in medical literature of patients receiving proper treatment and training at the onset of epileptic symptoms, and as a result the disease disappeared and did not return. It is my opinion that the laity do not understand the seriousness of epilepsy. They need training, and right here is a wonderful opportunity for the social worker and visiting nurse. Parents, school teachers and officials of industrial plants should be taught to recognize the seriousness of epilepsy, and the importance of early and proper treatment and training. They should be taught to regard with suspicion the child or adult who sits around day-dreaming or staring, the one who is easily irritated, the one who is impatient, the one who complains of fainting, vertigo or sudden pallors. These symptoms often mean the beginning of epilepsy, especially if they follow any of the acute specific fevers, or occur at the time of adolescence or at the time of teething. After the onset of epileptic seizures the diagnosis should be easy, and no time should be lost before proper treatment is begun. At the onset the brain is probably not much injured, but in many epileptic patients the process of deterioration sets in early, and is progressive. After a patient becomes badly deteriorated, not only

the chances of recovery are affected, but also the opportunity for proper treatment. These patients cannot be trained, and training is an important part of the treatment of epilepsy. They should be trained to avoid day-dreams, staring, sullenness, impatience, to control their temper, regulate their diet and bowels, to avoid things that bring on seizures, such as excitement, anger, constipation, etc.

I am not making a plea to send every epileptic to an institution, but I do wish to plead for an early diagnosis and early treatment for every case. Undoubtedly there are many cases that cannot be treated properly at home, especially cases where the parents cannot or do not want to enforce the discipline necessary. The work recently begun in this State of examining mentally and physically the backward school children will no doubt uncover a large number of epileptic school children who are in need of treatment. The following tables show the age of onset, age of marriage, duration of epilepsy before entering this hospital, and the duration since entering this hospital of the 119 patients referred to above: —

| NUMBER. | Age at Onset (Years). | Age at Marriage (Years). | Pre-hospital (Years). | In Hospital (Years). |
|--------------|--------------------------|--------------------------------|--------------------------|-------------------------|
| 1 | 23 | 18 | 32 | 2 |
| 2 | 25 | 21 | 8 | 3 |
| 3 | 34 | 22 | 12 | 8 |
| 4 | 14 | 26 | 12 | 8 |
| 5 | 34 | 26 | 10 | 6 |
| 6 | 21 | 19 | 21 | 5 |
| 7 | 2 | 28 | 28 | 1 |
| 8 | 49 | 21 | 19 | 2 |
| 9 | 21 | ? | 16 | 6 |
| 10 | 12 | 18 | 27 | 1 |
| 11 | 24 | 24 | 4 | 9 |
| 12 | 5 | ? | 32 | 3 |
| 13 | 2 | 19 | 19 | 1 |
| 14 | 17 | ? | 8 | 10 |
| 15 | 22 | 16 | 8 | 1 |
| 16 | 55 | ? | 4 | 7 |
| 17 | 39 | 25 | 12 | 12 |
| 18 | 1 | 25 | 19 | 9 |
| 19 | 20 | 19 | 15 | 12 |

| NUMBER. | Age at Onset (Years). | Age at Marriage (Years). | Pre-hospital (Years). | In Hospital (Years). |
|---------|--------------------------|--------------------------------|--------------------------|-------------------------|
| 20 | 16 | 18 | 16 | 7 |
| 21 | 30 | 18 | 23 | 5 |
| 22 | 24 | 22 | 11 | 10 |
| 23 | 29 | 18 | 7 | 4 |
| 24 | 12 | 15 | 13 | 8 |
| 25 | 15 | ? | 16 | 1 |
| 26 | 39 | 24 | 1 | 5 |
| 27 | Birth | ? | 27 | 22 |
| 28 | 49 | 22 | 6 | 14 |
| 29 | 37 | 20 | 10 | 12 |
| 30 | 14 | 14 | 24 | 2 |
| 31 | 56 | ? | 4 | 8 |
| 32 | 68 | ? | 2 | 2 |
| 33 | 20 | 21 | 7 | 1 |
| 34 | 1 | 18 | 31 | 5 |
| 35 | 16 | 24 | 10 | 11 |
| 36 | 21 | 16 | 20 | 4 |
| 37 | 1 | 26 | 32 | 5 |
| 38 | 56 | 20 | 6 | 8 |
| 39 | 5 | 24 | 34 | 16 |
| 40 | 10 | 17 | 27 | 14 |
| 41 | Infancy | 18 | 31 | 6 |
| 42 | 5 | 18 | 17 | 1 |
| 43 | 41 | 21 | 21 | 4 |
| 44 | 18 | 18 | 9 | 2 |
| 45 | 39 | 31 | 12 | 2 |
| 46 | Infancy | ? | 36 | 2 |
| 47 | 26 | 20 | 6 | 19 |
| 48 | 17 | 15 | 32 | 2 |
| 49 | 25 | 23 | 16 | 1 |
| 50 | 17 | 31 | 43 | 6 mo. |
| 51 | 36 | ? | 12 | 11 |
| 52 | 30 | 25 | 20 | 4 |
| 53 | 2 | 25 | 33 | 8 |
| 54 | 18 | 22 | 18 | 14 |
| 55 | 12 | 19 | 13 | 9 |
| 56 | 10 | 18 | 35 | 3 |
| 57 | 24 | 18 | 22 | 3 |
| 58 | 5 | 31 | 35 | 5 |

| NUMBER. | Age at Onset (Years). | Age at Marriage (Years). | Pre-hospital (Years). | In Hospital (Years). |
|---------|--------------------------|--------------------------------|--------------------------|-------------------------|
| 59 | 15 | 23 | 27 | 3 |
| 60 | 23 | 18 | 9 | 13 |
| 61 | 19 | 16 | 33 | 3 |
| 62 | 16 | 19 | 9 | 1 |
| 63 | 29 | ? | 3 | 6 |
| 64 | 14 | 17 | 14 | 10 |
| 65 | 2 | 19 | 43 | 5 |
| 66 | 9 | 25 | 30 | 5 |
| 67 | 64 | 48 | 1 | 3 |
| 68 | 11 | ? | 22 | 10 |
| 69 | 16 | 22 | 34 | 1 |
| 70 | 44 | 32 | 1 | 4 |
| 71 | 16 | 16 | 35 | 10 |
| 72 | 14 | 19 | 9 | 2 |
| 73 | 16 | 17 | 17 | 15 |
| 74 | 53 | 21 | 3 | 2 |
| 75 | 20 | 21 | 20 | 16 |
| 76 | 15 | 19 | 7 | 4 |
| 77 | 15 | 23 | 11 | 15 |
| 78 | 16 | 21 | 32 | 4 |
| 79 | 52 | 21 | 12 | 1 |
| 80 | 12 | 23 | 51 | 1 |
| 81 | 18 | 22 | 8 | 7 mos. |
| 82 | 18 | 18 | 8 | 4 mos. |
| 83 | 24 | 22 | 7 | 3 mos. |
| 84 | 24 | 24 | 11 | 8 |
| 85 | 22 | 22 | 31 | 4 |
| 86 | 51 | ? | 11 | 2 |
| 87 | 25 | 20 | 4 | 2 |
| 88 | 3 mos. | 27 | 43 | 1 |
| 89 | 25 | 22 | 12 | 15 |
| 90 | 43 | 52 | 15 | 18 |
| 91 | 49 | 24 | 6 | 3 |
| 92 | 28 | 22 | 2 | 13 |
| 93 | 43 | 27 | 20 | 12 |
| 94 | 30 | 27 | 29 | 1 |
| 95 | 42 | 19 | 11 | 1 |
| 96 | 43 | 18 | 10 | 1 |
| 97 | 62 | 23 | 2 | 1 |

| NUMBER. | Age at Onset (Years). | Age at Marriage (Years). | Pre-hospital (Years). | In Hospital (Years). |
|---------------|--------------------------|--------------------------------|--------------------------|-------------------------|
| 98 | 29 | 23 | 14 | 3 |
| 99 | 21 | 21 | 13 | 11 |
| 100 | 13 | 29 | 27 | 18 |
| 101 | 15 | 21 | 34 | 6 |
| 102 | 27 | 25 | 2 | 7 |
| 103 | 37 | 21 | 6 | 1 |
| 104 | 7 | 23 | 26 | 1 |
| 105 | 1 | 24 | 30 | 5 |
| 106 | 48 | 26 | 2 | 5 |
| 107 | 41 | 26 | 12 | 4 |
| 108 | 41 | 30 | 25 | 7 |
| 109 | 24 | 14 | 28 | 6 |
| 110 | 44 | 27 | 12 | 8 |
| 111 | 58 | 27 | 7 | 1 |
| 112 | 23 | 22 | 9 | 2 |
| 113 | 9 | 28 | 28 | 6 |
| 114 | 15 | 27 | 12 | 12 |
| 115 | 20 | 24 | 15 | 8 |
| 116 | 20 | 20 | 24 | 5 |
| 117 | 39 | 34 | 4 | 5 |
| 118 | 14 | 27 | 19 | 7 |
| 119 | 1 | 22 | 31 | 6 |

THE FIRST EIGHTEEN MONTHS OF THE MONSON STATE HOSPITAL LABORATORY.

BY A. E. TAFT, M.D.

The first and most important undertaking, on the opening of the hospital laboratory, Jan. 1, 1909, was the planning and choosing of proper equipment for the quarters allotted to the work. While the plans were being carried out, study was begun of the histopathological findings in the trunk organs of epileptics.¹ This was started at the neuropathological laboratory at the Harvard Medical School, of which the late Dr. E. E. Southard was the head. The material was made up of all the specimens available at the Monson Hospital, and additional specimens from other State hospitals, including Worcester, Danvers and Westborough. On April 1 the hospital laboratory was largely in order, and from that time the work was carried on there. The most interesting and time-consuming study, involving the use of a large number of animals, was a repetition of the Brown-Séguard guinea pig epilepsy experiment done at the suggestion of Dr. Southard. The results, in the production of convulsions, resembling typical epileptic attacks, were quite striking. This was considered of sufficient interest, in view of the unsatisfactory results obtained by some other investigators, to lead Dr. Flood to have moving picture films made of animals in the state of convulsion. This was done by Dr. Harry Chase of Brookline. The final result sought in the experiment, *i.e.*, the transmission of convulsive tendencies to the offspring, was entirely negative. This added a bit of evidence to the general question of the inheritance of acquired characteristics, as well as to the special question of heredity in epilepsy.² Meanwhile, the routine work of the hospital was carried on in the study of post-mortem material which was yielded by current autopsies.

An additional experiment, to which the Monson Hospital contributed at that time, was the Much-Holzman fixation test carried on at the serological laboratory at the Harvard Medical School, then in charge of Dr. F. P. Gay. Blood specimens from a number of insane epileptic patients were included in this study.³

In addition to the foregoing, a group of brain specimens from cases autopsied during this period were used later (1916) in making a study of the findings in the corpus callosum in cases of focal gross cortical brain atrophy.⁴

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EPILEPTIC AURAS.

BY H. M. WATKINS, M.D.,

ASSISTANT PHYSICIAN, MONSON STATE HOSPITAL.

Aura signifies in its literal meaning "vapor or emanation from the body." It was first used by Pelops, the master of Galen, who was struck by the fact that the sensation with which many attacks started — commencing in the periphery, as the arm or leg — seemed to ascend to the head, following which consciousness was lost. Frequently the patient would describe it as a cold vapor; Pelops at that time suggested that it might be such passing up the vessels which at that time were supposed to convey air, hence he termed it spirituous vapor. This theory was held until the discovery of the functions of blood vessels and nerves, then its seat was transferred to the latter.

We now recognize an aura as the subjective commencement of an attack manifested by motion, sensation or a mental state, and although the process seemingly starts in the periphery, it is in reality the result of the commencing process in the brain.

Frequency of Aura. — This has been variously placed. Gowers¹ in his textbook states that it was present in 1,145 cases out of 2,013, or 57 per cent. Spratling² in his investigation states that he found 36 per cent present, in about an equal distribution of males and females. Other writers give its presence in from 27 to 78 per cent. My observation covers a series of 430 female patients, observed at the Monson State Hospital over a period of eight months. It is somewhat difficult in an institution such as this to obtain as high a percentage of aura as could be obtained from patients in the earlier stages of the disease, due to the fact that a large per cent of our patients have deteriorated to such an extent that they cannot co-operate with us. About 200 cases were eliminated on account of mental defectiveness primarily and deterioration, leaving 230 cases that were observed. Of this number, 111 gave definite aura, or approximately 48 per cent.

Classification of Aura. — Auras are difficult of classification, due to the fact that there are overlaps and combination of the different forms. Occasionally it is observed that a part of three

or four forms are shown by the same person; not infrequently the form of aura will change. One case of admission ten years ago gave a definite visual aura, and on readmission in 1921 gave a clear epigastric aura.

Gowers¹ divides auras into seven forms: (1) unilateral aura, a sensation in one side of the tongue, face, leg or arm; (2) general aura, a bilateral sensation in the limbs, tremors, etc.; (3) aura referring to certain organs, the most important being those that follow the distribution of the pneumogastric nerve, the most frequent being the epigastric; (4) vertigo and allied sensations; (5) cephalic; (6) psychic aura, the consciousness of an emotion or an idea; (7) special sense warnings.

Spratling divides them into four groups, — sensory, motor, psychic and mixed.

My classification has followed that of Gowers, with the following result: unilateral aura, 16; bilateral and general, 19; special organs, 35; vertigo, 9; cephalic, 4; psychic, 10; special sense, 18.

In the unilateral group of 16, eight commenced in the arm, four in the leg, four involved both leg and arm, and one involved the arm, described as a “tingling sensation running upward from the finger toward the body,” consciousness being lost when sensation reached the head. As a coincident five hemiplegias were studied, all of which described a unilateral aura, the aura commencing in the paralyzed side in each case and consciousness being lost when the sensation reached the body. Two of the arm auras recognized visible contraction of the member preceded by a tingling sensation commencing in the index finger and ascending to the shoulder before loss of consciousness.

The leg auræ usually commence in the foot and ascend to the groin. One of these described the sensation as moving from groin toward leg.

Bilateral and general sensations were present in 19 cases. The bilateral sensation resembles unilateral auras except for their distribution. The same numbness and needles and pins as described in the unilateral aura were present, usually involving both arms or both legs, the arms more often. Four cases of general aura gave “weakness” and malaise. One described marked tremors over entire body.

Special organ sensations were described in 35 cases, the epigastric being by far the most common. Twenty-seven cases gave definite aura in which the stomach was first involved; this as a

rule was described first as a nauseated, weak feeling, frequently faintness. Four of these 27 described the sensation as ascending toward the throat and losing consciousness when the sensation reached the thorax. Two described that they seemed to raise "something in mouth," but vomiting was not elicited. One of the most interesting described a sensation "as if a veil was being lifted upward from the stomach then dropped again," following which she lost consciousness. Occasionally this aura seemed to be accompanied by a twitching of the left eye, and left temple; convulsions in her case usually started on the left side. Three of the 27 described the sensation as a "gripping, painful feeling in intestine," like a diarrhoea. Eight started in the stomach and were referred to the cardiac aura as a definite pain.

In general all visceral auras were referred to organs that are enervated by the pneumogastric.

Vertigo is described usually in the form of distress, a sense of giddiness, light headedness or rotation. This was described by 9 patients; 4 state that objects seemed to turn from one side to another, usually from right to left; 1, that objects seemed to grow smaller and smaller until consciousness was lost. Two were accompanied by an epigastric aura. Head sensations were described in 4 cases; actual pain, "worse than a headache," was described by 3, consciousness being lost immediately after the head sensation. One case was so closely interwoven with vertigo that it was hard to tell which sensation was felt first, the sensation of pain or the sensation of rotation.

Special sense auras were present in 18, 11 visual, 4 auditory, 2 olfactory and 1 gustatory. The visual aura appeared chiefly in the form of colors, red predominating, although blue was given in one instance. Two had photophobia, 4 described actual pain in eyeball, and one described the sensation as "magnifying objects." The auditory auras were "sense of giddiness," "roar in ears," "deep sounds getting louder and louder, then loses self." One olfactory was described as "pleasant perfume," then loss of consciousness.

Gowers¹ states that a true gustatory aura is rare; that it occurs about once in 200 cases. One such case was found as a sensation of "bitter quinine" in back of mouth, although the other times she had described a typical gastric aura.

The last group, psychic auras, were found in 10 cases, and constitute the most interesting forms of auras. They are

usually found in cases having preponderance of petit mal seizures. Frequent attempts at examination were necessary because the evidence given has to be checked up over a period of time, and a great deal must be discarded. Many of these cases have seizures petit mal in type that are not observed by the nurses, or by her companions on the ward, and consciousness is lost only for an instant in the majority of attacks. Seven of the 10 cases stated that they had the sensation unaccompanied by convulsive attacks in the majority of instances. These attacks, in checking over the history, were frequently not put down as real seizures, although in my opinion consciousness was frequently lost and definite petit mal seizures were present. The most common sensations were "thought of dying," a feeling that cannot be explained; "sensation of unreality," floating about; "not on earth." This last case would occasionally state that she could recognize some one talking to her, but could not understand the words; she seemed to be conscious of sound but could not interpret. Emotion was present in 3 cases: "sadness almost killing," "relative being slain, or some bad news being brought." One described a feeling as if a girl were coming toward her with outstretched arms, the fingers would touch her throat, she then seemed to float away in a "dreamy state." The patient described this sensation immediately before losing consciousness as very pleasant to her. One case deserves special mention on account of the rarity of the observation; only a few cases have been reported in which there was a crude sensation of smell combined with a psychic aura.

CASE OF M. M. — Aged forty-seven. Epilepsy began three years ago. Family history was negative. Ten years ago, while assisting at a surgical operation, her left arm became infected. She attributes her condition to this infection, although the history does not record convulsions until six years after that date. She describes a sensation of a foreign odor. This is neither pleasant nor unpleasant, but is recognized as some odor that is foreign. This is combined with a peculiar taste which is neither bitter nor sweet. At times she will be observed to be in the act of moistening her lips, occasionally swallows, or will attempt to spit. This sensation is followed by a dreamy state in which she is floating among the clouds. She feels light and unreal, then "loses herself." At times she appears to be blushing, both sides of the face equally at this time. She will frequently complain of having a great number of these sensations in one day. During her four months of observation in hospital she has had only three attacks that were actually observed by the nurses, and recorded as petit mal seizures. After having a number of these sensa-

tions following in rapid succession, she shows the typical irritability and confusion of the epileptic. She gets into trouble easily on the ward, and after this will admit to the physician that she has not been herself; that she is having those funny feelings and sensations above described.

Jackson³ reports a similar case which at autopsy showed a tumor of the temporo-sphenoidal lobe. Another case was reported in "Brain," in 1899, by Jackson and Coleman,⁴ in which a small area of softening was found in the uncinate gyrus. Jackson also states that there is not always a loss of consciousness, but that there is at least a defect of consciousness.

It is my opinion, in the case of M. M., that consciousness was definitely lost, although it may be instantaneously and unrecognized by observers. There have been various claims by different writers that these crude sensations of smell combined with psychic auras point to a tumor of the uncinate gyrus, as the center of smell and taste are supposed to be located in this area. A search of the autopsy material in this institution does not show any case that clinically had an aura of this sort that later came to autopsy.

General Observations of Aura. — Our limited knowledge of auras does not warrant a strict classification. Many forms overlap and sometimes disappear entirely. Auras are frequently unobserved and undescribed in case histories. This is a frequent, everyday occurrence. With more accurate details and observations of cases I believe the percentage of auras would be much greater. The more sudden the onset and the more profound the convulsive phenomena the less likely is the presence of aura to be elicited; hence in a patient having grand mal seizures we are less likely to obtain an aura than in those cases that have petit mal seizures, or a combination of grand mal and petit mal attacks. Practically all patients interviewed claimed to have their auras occasionally without convulsions. The length of time that elapses between aura and convulsion varies from seconds to even hours, usually seconds. Three cases stated that they could tell two or three days, occasionally, before having their attacks. If there does elapse any great length of time between aura and seizure this time might be used in a therapeutic way, and a few cases might be benefited by treatment between the aura and attacks, although I have no definite statistics on the subject, and my own observations would be too meager to state that there was a chance for therapy between

the sensation and the attack. It is difficult to state which form of aura possesses the greatest clinical significance, although it would follow, due to frequency, that sensory sensations are more important, such as numbness, tingling and feeling of discomfort that are present immediately before the actual fit began.

Auras should be investigated in every case, as it would at least give us some theory as to the part of the brain that might be affected, and, as before stated, it might be of some therapeutic value in a limited number of cases.

I do not think we are able to definitely state what the pathological process is, or its definite location in the brain, except in a very limited number of cases.

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EFFICIENCY OF EPILEPTIC WORKERS.

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The discussion here deals only with persons in the institution. It is likely that there are epileptic people outside of an institution who have a large degree of efficiency, but even these, so far as I have known them, require the personal attention of some one in the family. Very often a man who does a good business, only having the attacks at night, is taken care of by his wife, and nobody in the community knows of his affliction. However, it does require effort on the part of some one to care for him; his hours must be regulated by the individual, often his diet has to be carefully insisted upon, and these people are often headstrong, so that the matter of restraining them from ill-considered movements is considerable effort.

In dealing with our hospital cases, of course, there are large numbers of feeble-minded patients, and some of them are imbeciles and idiots to a degree that it is not possible to expect any work from them. There are often bedridden cases, and those requiring personal attention of the nurse to the same degree that a helpless infant would. They can never be taught to do anything. It may seem that I am trying to demonstrate inefficiency in these people, but the real point is to show what specified cases can do, and then try to draw some general conclusions.

A certain number of cases of epilepsy have *senium præcox*. I have known a few who, earlier than the age of thirty years, have been practically senile, while there are many cases of dementia before that age. There are no hospital cases who can work helping the carpenter or painter on an elevated place; in fact, there is very little about carpenter work beyond sweeping up the floor of the shop that any of our patients can do. In painting there are always a few who can help considerably. In dealing with the garden crops patients are wasteful; much small fruit is destroyed. A few can milk, but the number is small. A few can work around the cows, sweeping out the barn. Occasionally we have a patient who is fit to go with a teamster.

Some can work in the kitchen, laundry, bakery and industrial room, etc. A very large number can help about the ward, polish the floor, clean the brass, make beds, etc. No patient can work on the ice, gathering it into the house, or on the pond. One can drive the horse back and forth for lifting ice. However, generally the weather is too hot, too cold or too wet for regular out-of-door work by any except a small number. Patients who do work about the offices often knock the books and ink off the table. On one occasion three of these women were down with epileptic seizures at the same instant in the office. Then there would be the difficulty of getting them back to the ward and getting some one else to carry on the work. On another occasion I observed the attendant and six men who went a quarter of a mile to spread a load of cinders on the road. They might easily have accomplished this in five or ten minutes, but they were so slow that when they returned the forenoon was practically gone. It is impossible for them to hurry, and any deviation from the regular form they are very slow to understand.

Many ludicrous excuses are made in order to be relieved from work. They include such as "Stooping makes me have spells." "All my doctors at home have told me I must not work." "I won't work like a horse." "My parents do not wish me to work." "My board is paid and I won't work." "My rupture prevents me from working."

A patient who was walking away from his building, going reluctantly to his work, heard some one's name called by a voice at a distance, and willingly assumed that he was being called. He went back, walked slowly all along the front of his building, scrutinizing each window. After a five minutes' search he concluded that he had not been spoken to, and went to his place of work, looking often over his shoulder as if by chance he could devise another excuse for delay. He was of an obliging turn of mind, and really meant to be helpful rather than to waste his time.

The capacity of such persons to work is very limited; 1 in 20 will prove a willing worker for a limited time. They make great claims of the advantage they have been to the hospital, even claiming that the work done is worth thousands of dollars, when, as a matter of fact, to keep them occupied is an actual trouble and expense. I think those who make the largest claims are the ones whose work amounts to the least. Even willing

workers are slow in movements and inactive; they do not work thoroughly; they make expensive blunders, and when far advanced in the disease they have not sufficient judgment to carry on a piece of work alone.

Our patients have about six hours of work as a maximum, and very many shorten this at both ends, and by days off when some slight bad feeling is noticed, so that the average hours of labor for the ordinary case is not over twenty per week. It takes very little to lay a patient off duty. If he is indisposed ever so little he prefers to wait for the doctor's visit, get in an appeal for medicine or extra diet, and spend the rest of the day sitting around, using as much tobacco, chewing and smoking, as the law allows.

There is a hypochondriacal condition which is positive, and an actual inability to get up to the point of exertion which seems desirable for their own welfare. Unexpected hemorrhages occur; pains of a violent type in the head or digestive tract, neuralgic explosions, positive weakness, inability to sleep are not uncommon, and in hundreds of cases work is at times quite out of the question. None can be rightly expected or exacted.

When such a condition is admitted by the medical officers, the patient is apt to come to rely on that sort of excuse to get exemption from work, and in many cases he gradually becomes unconsciously untruthful and self-deceived. A hearty appetite is not always sufficient justification for insisting on the patient's going to work. He eats overmuch and is still too sick to make exertion.

Very often fathers advise their sons to work and make themselves useful, as by so doing they help the parent in the matter of support. This is an incentive, and nearly always such patients are useful, cheerful, not so much inclined to grumble, and are, besides, much better as to their own health than those who have not this sensible advice from home.

One man states his determination not to work on the farm; another declares he will never work in the laundry. Some claim that if they can work here they can go out and earn money without institutional restraint, or at home, where often these people, as indicated by their records, are, in their respective communities, a menace to others because of this lack of restraint and supervision.

In the case of a patient all the disciplining we are able to do is to move him from the ward or cottage to another where the

privileges are less. We never allow a patient to be deprived of food or to be secluded for punishment. These limitations of authority are well understood, and these methods, as a rule, work better than any severe type of discipline.

A patient who was in a cottage with full freedom of the grounds refused to work, and kept at a distance from the nurses, so that it was difficult to capture him for about twenty-four hours. He would warily watch the person who was trying to secure him, and withdraw as fast as he was approached. If several persons made a move for him, he would run to a far-away place and hide, so that it was a problem how we could get him. He knew that he would be taken to a closed ward and not allowed the same outdoor advantages, but his claim that his parents did not wish him to work was unfounded, as they were very desirous of his getting more industrious habits. He kept aloof for one night, missed three meals, and then capitulated. After his short sojourn in the wards he promised to work, and for a good many months, or until his disease was so severe that he was bedridden, he worked comfortably a few hours each day, and fully enjoyed life. He said he was happier than ever before, and was glad we had insisted on his doing something.

Supervision is often necessary in regard to such details as mittens for hands or ear protection in cold weather, and the extent of such supervision depends on the class of patients under consideration.

There are some who are unsafe to trust with any instrument which might be improvised as an agent of some form of destruction, such as breaking of glass or assault and battery, which condition may be in evidence at all times, or only at or about the time of seizure, and often without warning.

Patients may be divided into four classes from the standpoint of efficiency, as follows: first, those who are incapable of any work, because of such conditions as being too young, too feeble mentally, which includes other mental aberrations, too feeble physically, which includes those who are too old; second, those who for one or more of the various reasons can only do work to the extent of 25 per cent; third, those who are capable to the extent of 50 per cent; fourth, those whose capacities are as much as 75 per cent. As noted, the latter class more nearly approach the normal. These percentages are estimated after considering ordinary supervision, time lost and quality of work.

Under the first class should be mentioned those who have had home conditions which encouraged them in the thought of valetudinarianism which left an impression on their mentalities hard to eradicate. Such patients, however, who have entered and attended schools of feeble-minded, when this has been found necessary, have often become useful to themselves and to the institution to which they are entrusted for care. The minds of such people are so prone to deterioration that they develop vagaries which interfere with their efficiency; for example, a boy so anxious to please and to be praised that he almost annuls his usefulness by his frequent requests for commendation. If he perspires freely at any time he calls attention to it, or to any other evidence of labor which would indicate something of his great exertions.

We have always reported the percentage of patients employed at from 50 to 75 per cent, a large number of these being very inefficient and working only on the wards. If we leave out these ward workers there are not more than 30 per cent in more useful pursuits.

After finding the efficiency it would seem that by adding the labor of 3 ($33\frac{1}{3}$ per cent) men or of 10 (10 per cent) men we would have results equal to what 1 normal man produces. This can scarcely be said to be true. We are still lacking something. On the simplest kind of labor we may be able to prove the position; in case of any labor that is complicated we shall be short.

The following cases yield an average of about 32 per cent. Of course, it is manifest that any other group of patients would yield a different per cent. A rough estimate has been made that out of 1,000 patients a 10 per cent degree of efficiency may be shown. After reading these cases the question naturally occurs to each one whether these powers of work can be developed. For my own part I believe that every effort has been made with the most of these cases. If anything further could have been done it was only possible in early life and while the child was still under the care of its own family. On the part of the hospital worker I think the fields of ingenuity and of assiduity have been covered.

During the war period 200 of our patients found work alone or by the aid of friends. Very few of these have returned to us.

V. O., aged thirty-six years. Works in cow barn, milks four cows and takes care of them. Averages four hours of work each day. A day's work would consist of arising at 4.30 A.M., making his bed, going to barn

at 5 and milking for an hour, returning to ward for breakfast at 6.15, going to smoking room until 7.30, then returning to work, taking care of his part of the herd and putting the barn in order, working about two hours altogether. In afternoon from 4 to 5 o'clock he milks the four cows again. Between his hours of work at the barn he is staying around the barn, but will seldom do any extra work other than mentioned.

Requires an average amount of supervision, except during and after his convulsions. At that time he frequently has mild delusions of persecution, unsystematized (thinking that a spiritualist is causing evil spirits to work within him, and persecuting him in various other ways). At these times he has to be put in seclusion for two or three days, after which he is allowed his usual privileges. He was advised to oppose the delusional state of mind, as it would be an evidence of insanity, and he said, "I never thought of that," but in an hour had no recollection of what had been suggested to him. Asked to work more than usual, he refused. He thought he was doing all that was good for him. Sometimes he goes to manure pile and works it over from one place to another; does this as the mood strikes him for an hour or so — says it is good for the fertilizer.

He is allowed only a limited parole, and is especially watched after a convulsion. During September he had only one convulsion, this being on the 24th. He usually averages three grand mal attacks per month.

Attends the dances occasionally, but does not dance; attends the ball games and moving pictures. Is allowed to go to Palmer, by usual method, accompanied by an attendant.

Considering the nature of the work, the supervision required, and the number of hours worked this man's efficiency would be around 30 per cent.

This is on a rapid decrease, as he now has to be in a ward for two or three weeks at a time. He generally reads, or looks at a book, often the Bible, without turning leaves, smiles, and says nothing except when he is urged.

G. K., aged thirty-two years. Patient works on ward, swabs on an average of one hour per day. Arises at 5.45 A.M., makes his bed, has breakfast on ward at 6.15, swabs for an hour afterward.

This patient requires constant supervision. Has an irritable disposition, and if not watched constantly gets into quarrels with the other patients. Has an average of three grand mal convulsions per month, and is usually in seclusion following an attack. He averages being in seclusion three days each month. During September he was in seclusion the 24th, 29th and 30th. During August he was in seclusion the 9th, 10th, 11th and 13th. At the time he is recovering from a convulsion he has delusions of persecution, auditory hallucinations, and illusions; becomes deluded, confused and irritable. This man was tried on the outside gang to work, but he will escape when given the slightest oppor-

tunity, or will have altercations with the other patients continually unless watched. Frequently he strolls around the ward trying to start trouble with the patients and attendant.

He attends entertainments. Since castration has been less demonstrative and promises good conduct if allowed out. For September he had one grand mal convulsion on the 17th and 27th.

He has no parole, and is allowed outside only when accompanied by the attendant. Takes about three walks per week with the other patients and an attendant.

Considering the number of days lost by his seclusions, those lost from convulsions, the small number of hours worked, and the constant supervision required his efficiency could not be placed above 5 per cent.

V. B., aged thirty years. Works with outside gang, and averages five hours per day considering the time lost from seclusions and convulsions. His work consists of digging ditches, shoveling, working on roads or assisting in any of the outside work. An average day's work would begin at 7.30 A.M. and last until 11 o'clock, having two hours off for dinner, returning to work at 1 and working until 3.30 P.M.

Requires constant supervision. Has frequent grand mal attacks, following which he is confused and often dangerous and violent, and at times deluded, often having altercations with the other patients. Is in seclusion about three days each month owing to the above conditions. At times he wanders away from hospital. During September he had one grand mal attack on the 5th and 11th, two on the 19th, and one on the 22d. Was in seclusion the 23d, 24th and 25th of September. On the 27th he wandered away from the hospital and was gone the entire day.

His amusements consist of attending the dances, moving pictures and ball games. He is especially fond of the dances, and seldom misses one except when in seclusion.

He is strong, but indolent; ready, does but little work, though he will sometimes make a spurt for a few minutes. Prefers to stand and look on. He does very good work when he has not had a convulsion for several days and is entirely over the effects from the last one. If it were not for the seclusions and time lost from convulsions, his efficiency would be much higher. Usually the entire day is lost when he has an attack. He often says his work is valuable, and wants reward for it. Efficiency, 25 per cent.

W. G., aged fifty-one years. Works in industrial room and washes automobiles, and averages five hours per day. Work consists of making mattresses and sorting the hair for them. Average day's work would begin at 8 o'clock and end at 11 A.M., two hours off for dinner. Works one hour in the afternoon on mattresses, and another hour is spent washing and polishing the hospital automobiles.

He requires very little supervision. Has worked in industrial room for past seven years and understands the work fairly well. Has had no

convulsions the last year, and previous to this only averaged two per year. Right leg has been amputated below knee, but has well-fitting stump, so disability does not interfere with his work.

Amusements consist of riding in automobile occasionally, taking walks, attending dances, moving pictures and ball games, but cannot participate in dances or ball games. He is a very good worker, is willing and fairly capable, and requires little supervision.

Considering all factors his efficiency would be about 60 per cent.

R. H., aged twenty-three years. Works in store. Work consists of running errands, weighing groceries, putting up orders, keeping stock in order, and assisting in general work of store. Day's work begins at 7.30 A.M. Works until 11, two hours off for dinner, returns at 1, and works until 3.30 P.M., an average of six hours per day.

This patient requires very little supervision. He is told to do a certain piece of work, and does it properly without constant supervision or being told the second time. Has a fair amount of initiative and can see things to do.

Has an average of two convulsions per month, but soon recovers from the effects of them, usually not being away from work more than an hour after each attack. During September he had one grand mal on the afternoon of the 2d and was absent only half an hour; had a second attack the morning of September 21 and was away one hour.

His amusements consist of attending the dances, which he takes great interest in, the ball games (sometimes playing himself) and the moving pictures. He goes on a visit three or four times a year, staying from one day to a week each time.

This man represents one of our most efficient type of patients, as he requires little supervision, puts in long hours (for a patient), and has very few attacks. His efficiency would be estimated at 75 per cent.

J. G., aged sixty-four years. Works on outside gang, taking care of lawns, keeping roads and walks in condition, raking and burning the leaves, and cutting weeds in season. Averages six hours per day. Works from 8 to 11 A.M. and from 1 to 4 P.M.

Has few attacks, only two during the year 1919, those occurring in June and being of the grand mal type. Requires little supervision. Is a slow worker, but when given his own time is quite faithful. He gets tired easily. Has a cardio-renal disease complicating his epilepsy, and is not allowed to do any heavy work.

Was in hospital for two months in 1918, was readmitted in June, 1919, has not been on visit since readmission, but often expresses a desire to go home. He attends the moving pictures weekly in winter, takes walks about grounds, has outside parole, attends the dances, but does not dance.

Considering the nature of the work, supervision required and number of hours worked, together with physical disability, his efficiency would be about 45 per cent.

J. S., aged fifty-five years. Patient works in machine shop and boiler room. Arises at 5.45 A.M., has breakfast at 6.15, makes his bed and helps arrange room, goes to smoking room for an hour, and starts work at 8 o'clock. This patient is of an inventive mind. While he does little actual work in the machine shop, he is constantly "tinkering," trying to invent something. He does an average of two hours' work per day, such as sharpening knives, scissors, lawn mowers, etc., also assists the mechanics at small jobs. The remainder of the day he spends on some new invention of his own. Has strong likes and dislikes for certain kinds of work. Has explosive outbursts of temper when opposed. If asked to do something that he does not like to do, will say, "I can't do that," or "I never was accustomed to doing that;" but on something that he is especially fond of he will tinker for hours.

He requires little supervision, and has had no convulsions since admission here. He is not allowed to go home on visits, but has parole of the grounds. Frequently takes automobile rides with the engineer. Attends moving pictures and occasionally the dances.

The number of hours worked (actually) for hospital, the amount of supervision required, and the nature of the work would place his efficiency at 20 per cent.

L. W. G., aged thirty-six years. Born in Connecticut. He was married, has two children, had been in the army and abroad. So far as we could learn he did fairly satisfactory work as a private. When he came out of the army he was disagreeable to his wife, is said to have threatened her, although he denies this, but she did not want him at their home, is of a litigious nature, always has a suit in view for something. He was taken to the Psychopathic Hospital for observation, appeared manifestly epileptic and was brought here. He had but one convulsion while here. He could work in the store very efficiently, was reliable and accomplished a fair amount of work. Sometimes he was opinionated and unwilling to take orders as to just how he should do his work. The Red Cross was interested in him and arranged to get compensation for him, but he was unwilling to accept this — said he was well and able to work, and that his wife was merely trying to arrange so as to keep him under hospital care. He was finally taken away from here by his brother, on the promise that he would stay with him and would not go near his wife. He seemed able to make his own living, kept himself well clothed, and he knew how to manage about buying his clothes and keeping them in order. His efficiency would be rated 50 per cent.

J. C., aged sixty-five years. Came to this hospital at the age of 45; epileptic all his life; somewhat simple-minded. Man of slight build; looks in feeble health; learned the printer's trade, and ever since he has been here he has done the printing for the hospital, sometimes alone, sometimes with the aid of another patient who has been a printer, and sometimes with only the foreman of the shop. He has very severe attacks, frequently gets his type in order, and falls with the stick in his

hand, scattering the type all over the floor. When he comes to he patiently picks up the type and puts it back in the stick. The mild attacks, which he has more frequently than the severe, consist of a few seconds of unconsciousness, when he stands, twists his head around, drops whatever he has in his hand, comes to gradually, generally does not fall, but sometimes sits down. He is very conscientious, and devotes most of his spare time to leading blind patients around; goes to their rooms and reads the Bible to them; devotes his time to them so that he is a nuisance. The amount of work that he accomplishes in the printing office is considerable, and his work would be very much missed, but he is inclined to quarrel with his associates about how the windows should be adjusted and other minor matters, generally makes a long conversation, and has to be cut short or he would take up no end of time. He forgets easily, sometimes gets his printing upside down, but on the whole brings out very fair results. He cannot do any other kind of work except the printing press. The efficiency as a worker might properly be rated at 25 per cent.

A. W., aged thirty-four years. Works in Clough Building kitchen two hours per day and in dispensary four hours per day. An average day's work would consist of arising at 5.45 A.M., making his bed, having breakfast at 6.15. At 6.45 begins to wash dishes. When they are finished he assists in cleaning the kitchen, which takes until about 8.15. He then goes to the dispensary where he assists in sweeping and swabbing the floors, dusting the shelves and apparatus, destroying the soiled dressings, washing bottles and running hospital errands; also keeps the X-ray equipment clean and dustless, and assists in doing any sort of work except the handling and compounding of drugs. His work lasts until about 11 o'clock. Has dinner at 11.15, after which he helps with the dishes again, returns to dispensary, and works until about 3.30 or 4 o'clock. Another of his duties is to assist the priest at Mass. Does not work on Saturday afternoons.

Has an average of two grand mal seizures and two petit mal seizures per month. Can usually tell when he is going to have one, and will go to the ward, not returning until he has recovered from it. About one-half of his attacks occur at night, and he is not away from work on account of these. His petit mal seizures are usually very slight and do not prevent him from doing his usual work. On September 11 he had one grand mal attack during the night. On September 19 he had one grand mal attack at noon, and did no work the remainder of the day; also had one petit mal attack on the 5th and another on the 16th, but lost no time on account of either of these. Requires very little supervision; has worked in the dispensary for nearly ten years and carries out his orders readily. There have been times in this patient's history when his mind has been much disturbed, when he has had hallucinations for short periods, and when he has been quarrelsome, but these periods are of very infrequent occurrence.

Attends the ball games weekly in summer and moving pictures in

winter, does not dance; has outside parole and takes frequent walks; occasionally goes to Springfield with an attendant. Efficiency, 70 per cent.

E. D. M., aged thirty-three years. Patient works in greenhouse, assists in taking care of plants, making of flower beds, potting plants, hoeing in garden, and in general work about greenhouse. Works an average of six hours per day, except the days when he has a convulsion or is away on visit. Is considered a very good workman.

He has an average of two convulsions, and is usually away from work the remainder of the day after having one. On August 30 he went to Worcester on visit, returned September 3. On September 9 he had one grand mal convulsion and was away from work the remainder of the day. He requires little supervision, obeys orders and has a fair amount of initiative.

Attends dances Friday evening and Saturday afternoon, and ball games during summer months. Has parole and takes frequent walks about grounds, and goes home for visit occasionally. Efficiency, 60 per cent.

W. C., aged thirty-nine years. Works in kitchen, averages five hours per day. Assists in preparing food and vegetables, and keeping kitchen clean. Arises at 5.45 A.M., makes his bed, has breakfast at 6.15. At 6.45 commences to wash dishes, which takes about an hour, then assists in preparing the food and vegetables for dinner; works until 11 o'clock. Has dinner at 11.15, washes dishes, and then goes to smoking room for an hour, then to cottage for three hours, returning to kitchen about 5 for supper, after which he washes the dishes again.

Has very few convulsions, less than one per year on an average. Requires very little supervision, except after a convulsion. He is usually absent from work the remainder of the day after an attack. Has been working in the kitchen for the past eight years, and makes a very good assistant.

• Goes on a visit home twice a year, staying from one to four weeks each time. Plays ball in summer, and likes it very much; attends the moving pictures in winter, also the dances, although he seldom dances. Has outside parole and takes frequent walks about the grounds. Efficiency, 60 per cent.

L. S., aged eighteen years. Works on ward, and averages three hours per day. Arises at 5.30 A.M., makes his bed, and assists in making the other beds on the ward until 6.15, when he goes to breakfast; returns from breakfast at 7 and finishes the beds, then swabs for one hour, polishes the doorknobs and sweeps the rugs. Never does any work in the afternoon.

Has an average of five convulsions per month, four being of the grand mal type and one of the petit mal type. On September 20 he had three grand mal attacks; on the 21st, one grand mal attack; and on the 29th, three grand mal attacks. Was absent from work the entire day the 20th and 30th. His attacks are usually severe, and he is unable to do any

work the day the convulsions occur. When the attacks occur at night, he is confused and drowsy the following day and unable to do any work. Requires an average amount of supervision at all times.

Attends the moving pictures weekly in winter and ball games in summer, occasionally dances.

Has outside parole and takes frequent walks about the grounds. Goes home for a visit about once during the year and usually stays about three weeks. Efficiency, 20 per cent.

W. B. T., aged forty-three years. Works two hours per day on ward swabbing and assisting to clean the ward. Has worked at various kinds of work such as laundry, kitchen and dining room, but each time had to be removed on account of his irritable disposition and at times hallucinations and delusions. He threatens to complain to the Governor when things do not suit him. For the past month he has been on locked ward, and the only work he is capable of doing is swabbing about two hours per day when not having convulsions.

Has an average of three convulsions per month, principally grand mal in type. During September he had two on the 7th, one on the 8th, 19th and 28th, and was unable to do any work the remainder of each day after an attack. Frequently he has to be in seclusion following an attack, and he is very irritable and gets into quarrels with the other patients; also has hallucinations and delusions after an attack. Requires constant supervision.

Attends the ball games and pictures, accompanied by the attendant, but does not dance. Takes walks with other patients and attendant.

As he works only a short number of hours, and must be constantly supervised, his efficiency would not be over 5 per cent.

H. L., aged forty-four years. Works on ward, swabs the floor, and makes his bed. Arises at 5.45 A.M., has breakfast at 6.15, works about one hour each day, from 7.30 to 8.30. He is a left hemiplegic and does little work.

Requires constant supervision while on ward, as he frequently quarrels with the other patients. Is very irritable at times. Has an average of one grand mal convulsion each week. Following the attacks he becomes very irritable and has to be watched constantly. During September he had two grand mal attacks on the 7th, one on the 9th and 22d, two on the 23d, one grand mal and one petit mal on the 24th, one grand mal on the 26th, two on the 28th, and one grand mal on the 30th.

He attends the moving pictures weekly, also the dances, but does not dance; goes to ball games in summer. Has a limited outside parole and takes frequent walks.

Owing to his physical incapacity, his short number of hours of work, supervision required, and nature of work, his efficiency would be estimated at 5 per cent.

T. J. D., aged thirty-nine years. This patient works in smoking room, and cleans the hallways in the Clough Building. Works from 7 A.M.

until 9, then does nothing the remainder of the morning. In the afternoon he goes to barn and assists in caring for the stables, being especially interested in the goats. Averages about three hours per day.

He had no convulsions during the year 1919. Owing to a fracture of right side of skull in 1903 he has a loss of motion on left side. At the time of fracture there was complete left side motor paralysis. This tends to incapacitate him for very long or hard work. He is given charge of the smoking room, and keeps it very orderly. His work at the barn is easy, and he seems to be doing very nicely. He requires very little supervision. Efficiency, 15 per cent.

S. S., aged eighteen years. Works on ward. Arises at 5.45 A.M., has breakfast at 6.15. When he returns from breakfast he works for about three hours. Work consists of swabbing floors for one hour, helping with the beds, polishing brass, and assisting in general ward work. He does no work in the afternoon.

He requires a great deal of supervision and has to be shown constantly what to do next, and unless watched will wander away from his task, although he will usually finish whatever he has started to do. Has frequent attacks, but most of them occur at night. For the month of September he had forty-three grand mal attacks and one petit mal attack. Following the attacks which occur in the daytime he is unable to do any work the remainder of the day. Requires constant supervision, and after an attack must be kept on the ward.

He has parole and takes frequent walks and goes to Palmer with an attendant. Attends the dances, but does not dance; also attends the pictures and ball games. Has been home for a visit only once in last two years, staying for three weeks that time.

Considering the great number of attacks, his confused state following them, the nature of his work, and number of hours worked, with the great amount of supervision required, his efficiency would be placed at ten per cent.

W. D., aged forty-eight years. Patient works in dining room, arranging dishes, knives, forks and spoons on the table. After meals cleans tables, rearranges dishes, etc. Assists in mopping and swabbing the dining room, washes windows, and assists in general work of dining room. Averages four hours per day. Commences work at 6 A.M., sets the table, etc., has breakfast at 6.15, after which he cleans the tables and dining room, working for about two hours. At noon he assists for an hour, and the same at supper time.

Has an average of four convulsions per month, grand mal in type, and is on the ward the remainder of the day after an attack. For September he had one grand mal on the 5th, 9th, 12th, 21st and 25th. Has outside parole at present, and remains on grounds when not working or having convulsions. Requires a fair amount of supervision at all times, and special attention on the days when he has a convulsion, as he is frequently confused and deluded for a few hours following the attack.

Attends the ball games in summer and moving pictures in winter; occasionally attends the dances, but seldom takes part in them. Efficiency, 35 per cent.

H. P., aged twenty-five years. Works in cow barn, and averages about four hours per day. Work consists of milking one hour in the morning, and for three hours assists in taking care of the stables and herd. An average day's work would consist of arising at 5 A.M., milking for one hour, breakfasting at 6.15, going to smoking room for an hour, returning to barn at 7.30, and working until 10.30 or 11 o'clock. Occasionally he returns for an hour in the afternoon.

Has about two convulsions per month, and following an attack is absent from work the remainder of the day. Has both petit mal and grand mal attacks, about equal in number. At times he becomes easily disturbed, and will come to the physicians and complain of small happenings at the barn, or that other patients have said bad words to him. On September 6 he had one grand mal attack, away from work the entire morning. On September 21 he had a petit mal attack and did not work in the afternoon. On September 24 he went home on a visit and was away the remainder of the month.

Attends the dances, ball games and pictures. Takes walks in afternoon. Is allowed to go home for visits, especially during the Hebrew holidays.

Everything considered, hours worked, supervision required and nature of work, and number of attacks, his efficiency would be about 20 per cent.

J. B. S., aged seventy-one years. Patient works in industrial room, sorts hair for mattresses and assists in making mattresses. Averages five hours per day. Starts work at 8.30 A.M. and works until 11 o'clock; returns at 1 and works until 3.30 P.M. The work is not hard and requires little physical exertion. He sits in a chair indoors most of the time.

Has an average of one convulsion once in six weeks, grand mal in type, and is absent from work the remainder of the day after an attack. Requires little supervision. Has been doing the same sort of work for the past nine years and understands it fairly well.

Patient has outside parole and all other outside privileges allowed to patients. Takes frequent walks, attends the moving pictures weekly in winter. Does not go home on visits. Is not allowed to do any hard manual labor, as his blood pressure is very high (systolic 220). He has plenty of time to rest and his work is not hard.

Considering the nature of the work, the number of hours worked, and the small amount of supervision required, his efficiency would be about 50 per cent.

H. F., aged twenty-eight years. Patient works in bakery, and assists in making the bread and in the general work of the bakery. He arises at 5.45 A.M., has breakfast at 6.15, goes to smoking room until 7, when he goes to bakery and works until 11 o'clock. Does no work in the afternoon.

This man requires an average amount of supervision between attacks. He is not trusted with the weighing or mixing of bread, but does the rougher work of the bakery. He has frequent petit mal attacks, and following these cannot work on account of having coarse tremors, which last for about three hours. He has about one grand mal attack each week, and a daily average of one or two petit mal attacks. On September 4 he had one grand mal attack, another on the 8th, two on the 13th, one on the 21st, and one on the 31st. Following his grand mal attacks he is away from work the remainder of the day. Was absent from work seven days in September.

Amusements consist of dances, moving pictures and ball games. He frequently goes to Springfield accompanied by an attendant or another patient. He is allowed on visit about once during the year, usually staying about one week.

Considering his frequent petit mal attacks, together with a weekly grand mal attack, he loses considerable time from work. Considering this, with supervision required and nature of the work, his efficiency would be about 20 per cent.

J. W., aged forty-seven years. Patient works on ward, swabs the floors, arranges the beds and assists in making them in the morning. Averages three hours per day. Arises at 5.45 A.M., makes his bed, has breakfast on ward at 6.15. At 6.45 commences swabbing, and assists in cleaning the ward. Works two hours in the morning and one in the afternoon. Last year he was put on the outside gang, and while he was a fairly good worker, he ran away twice and was brought back with difficulty each time. The outside foreman had to watch him constantly or he would wander away.

He has an average of four convulsions per week, about half being grand mal and the other half petit mal in type. In September he had one petit mal on the 13th, one petit mal on the 14th, one grand mal on the 26th, and one of each on the 29th. He requires an average amount of supervision at all times, and must remain on the ward unless accompanied by an attendant. His grand mal seizures are severe, and he requires more supervision after one, as he is irritable and quarrelsome.

He is allowed to take walks with the other patients on the ward, accompanied by the attendant. Occasionally he is taken to the pictures and ball games, but has to be constantly watched when off of the ward. Efficiency, 20 per cent.

C. F., aged thirty-eight years. Works on wards, assists in general ward work such as swabbing, polishing brass, cleaning rugs and making beds, and averages two and one-half hours per day. Usual day's work would consist of arising at 5.45 A.M., making his bed, having breakfast at 6.15, going to smoking room until 7, after which he returns to ward, doing general work until about 9.30 o'clock.

Patient had an average of four convulsions per month, and at the time of attacks required a great deal of supervision. He is usually unable

to do any work the remainder of day after an attack. At times he is irritable with the other patients, but is easily managed. Had only one convulsion during September.

Is allowed outside privileges with other patients, takes frequent walks, and occasionally goes to Palmer. Attends the dances, moving pictures and ball games.

Considering the nature of his work, the number of hours worked (two and one-half), and supervision required, his efficiency would be about 15 per cent.

F. M., aged forty-five years. Patient works in paint shop and on outside jobs of painting. Arises at 5.45 A.M., has breakfast at 6.15, goes to smoking room until 7.30, returns to ward and makes his bed and puts room in order. Goes to work at 8 o'clock and works until 10.30, has dinner at 11 o'clock, goes to smoking room until 1 P.M., then returns to work until 3.30, and occasionally until 4 o'clock. He averages five hours per day working. He is a fairly good painter, but on account of his convulsions is never allowed to do high painting where a ladder is required. He can also mix paint fairly well.

Patient requires very little supervision, except following a convulsion (or owing to his temper), when he becomes quarrelsome with other patients. He has an average of two convulsions of grand mal type per month, and is usually absent from work the remainder of the day, but for the past three or four years has averaged five hours of work per day.

He is allowed to go on visits to his cousins, also goes to Palmer and Springfield with an attendant, and occasionally with another patient. Attends the dances, moving pictures and ball games.

Considering that this man works five hours per day, is a fairly good painter, although not allowed to work in high places, requires little supervision, his efficiency would be placed at 60 per cent.

G. R., aged twenty years. Very good looking young man, but subject to hallucinations and to periods of ecstasy. He has grand mal epileptic seizures of the very severest type, two or three a week. Prior to these attacks he is apt to have delusional states, and on one such occasion, when he was requested to go to his room, he refused. He said that there was nobody strong enough to put him in his room, and that he had such strength that he could resist any number of men. He wanted them to assign six men to fight him, showing how he would knock down one after the other. Finally two attendants approached him, one on each side, and carried him to his room, but he kicked and struggled all the way. He claimed at this time that he was misused, and the matter was carefully investigated. I should consider his attacks to be epileptic furor during such times as this. There have been periods when four men found it difficult to keep him from kicking them, but sometimes if the doctor approaches during this period of furor he becomes quiet instantly. His hallucinations are very marked. He often kneels in the road, and he claims that he is about to be cured of his epilepsy. He has to be kept

away from the entertainments and generally from religious services because he makes a disturbance. Yet he is able to go home alone on the cars and has several times done so at the request of his mother. He is very much opposed to working. He recognizes his delusional states, and says that he thinks he now knows better. He will push a swab about the floor, do some dusting, but he is very lazy and wants to wander about the grounds, sitting under the trees, conversing with another patient about himself, and in general does almost no work. If urged to work he becomes very much enraged, and says that he is not here to work, and refuses to take much of any part. Efficiency, 5 per cent.

A. B., aged twenty-five years. Has been epileptic all his life, brought up on a farm, and could do ordinary farm work at home. He has milked and been in the woods and chopped down trees, chopped up the wood and drawn it home with the oxen. Sometimes he had a fit while doing this, and the neighbors had to get him in.

Since being here his mental condition has been poorer, and he would not be capable of doing a job of work alone. He can be assigned something and will carry it out fairly well. In hoeing corn he fell between the rows of corn. The attendant was at the other end of the piece, and before he could reach him the patient had kicked around and dug up seventeen hills of corn. After this he was disabled for two days and did nothing. It took all the time of the assistant farmer to look out for him, and he finally said that it was too much work to keep him occupied, and he gradually did less and less work. He would sometimes say that his father was coming to take him home, and he would stand and look up the road for an hour at a time. If he had any rake or hoe in his hand he would lean on that, but scarcely moved. He has been known to do this for the greater part of the working hours, so that his work amounted to very little on such days. He thinks that his services are valuable, and that he has done a great deal for the hospital. As a matter of fact, his efficiency could not be rated at above 5 per cent.

Man, aged thirty-five years. Has been brought up by his mother alone and treated with the greatest consideration. He has never been required to do any work at home. Here he will do a little dusting, but he has misomeism, that is, he will not tolerate any changes. He wishes to run the swab in exactly the same line back and forth. He is never willing to deviate. He wants the same chair, food and dishes with the same arrangement. This misomeism has been carried to an extreme at times, but he is now considerably more demented. He is very particular about the regularity of things. He cannot be taught to do any other work but the very simplest thing, but he is able-bodied and seems capable of doing any hard work. He says that he never did any work that his mother did not allow him to, and he will not. His efficiency would be rated at 5 per cent.

Y., aged fifty years. He had been a tailor and here he worked at cutting clothes from patterns. He never did any sewing, but said he

was a cutter and had done the best grade of work. He claimed he had saved the hospital thousands of dollars by his work. As a matter of fact, it was very difficult to keep oversight of him.

He had the severest type of epileptic fits, and required attention for at least an hour before he recovered. He dropped his tailor's tools on the floor, sometimes broke them, very often cut garments wrong, ruining cloth, and soiled his own clothes and the new material. He was very angry if any one tried to direct him about his work. He could not bear to have the least instruction offered. He would not do any other work except the cutting, and at one time when he thought somebody else was going to be given work of that kind he secretly destroyed a large number of paper patterns. He finally died in a severe epileptic attack. The efficiency of this man as a worker would be reckoned as 10 per cent.

E. B., aged thirty years. Patient works in bakery. Assists in general work of bakery, — weighing, measuring, mixing and baking of bread. His hours of work alternate each week. One week consists of arising and getting to work at 6.30 A.M., working until 11 o'clock, and the alternate week he arises at 4 A.M. and works until 6, when he goes to breakfast, returning to work at 7.30 and working until 11 o'clock, an average of five hours per day. Does not work in the bakery in the afternoon. However, he is agent for the Sunday papers, and sells candy, etc., in the afternoons, making his spending money in this manner.

He requires very little supervision in the bakery, as he has been working there for the past eight years, and understands the work fairly well.

His attacks average about three per month of the grand mal type. Following the attacks he is usually confused, and consequently is away from work for the remainder of the day.

He attends the ball games, dances and moving pictures, and as a rule, carries his stock of candy, etc., with him, combining business with pleasure. Once or twice during the year he is allowed to go home for a visit, and occasionally to Springfield to purchase his candy, etc.

Considering the nature of the work, the small amount of supervision required, and the fact that after a convulsion he is confused and requires extra attention, his efficiency could be placed at 65 per cent.

G. L., aged thirty years. Patient works in marking room. Work consists of marking articles of all kinds, arranging and checking packages coming to hospital for patients, and assisting in general work of marking room. Is a very good worker, has a fair amount of initiative, and has been at the present work for about three years. Averages six hours of work per day, from 8.30 to 11 A.M., and from 1 to 4.30 P.M., with no work on Saturday.

Has very few convulsions, not exceeding an average of two per month; frequently goes three months without any. For September she had one grand mal the 21st, and one the 22d; was away from work one hour each time. Requires very little supervision, and gives but little trouble on the ward.

Attends the pictures and dances weekly, taking great pleasure in dancing. Attends church services regularly, and usually plays piano for same. Goes home for visit about once a year, and occasionally goes to Springfield with a nurse.

Considering the long hours worked, nature of work, and the small amount of supervision required, this patient would represent one of our most efficient female patients, her efficiency being placed at 75 per cent.

H. C., aged twenty-seven years. Patient works in dining room. She averages about four hours of work each day, from 6 to 8, 11 to 1, and 5 to 6, with time for meals, when not having convulsions. Her work consists of serving cold food, such as bread and butter, sauce, cookies; occasionally helps with dishes. Requires a great amount of supervision, and she frequently has quarrels with other patients.

Has frequent convulsions, averaging eight grand mal attacks per month. For September she had one grand mal the 3d and 8th; two the 9th; five the 18th; one each the 20th, 25th, 27th, 28th and 30th. Was away from work practically half the time during the month. At times following the convulsions it is necessary that she be placed in seclusion for a day.

Amusements consist of attending the pictures and dances weekly, her condition permitting. She also goes home for a visit twice a year. She is not allowed parole, but takes walks with other patients and a nurse.

Considering the number of hours worked, nature of work, and supervision required, her efficiency would be placed at 25 per cent.

L. S., aged twenty-eight years. Patient works on ward. Arises at 5.30 A.M., makes bed, has breakfast at 6.15. Averages about four hours of work each day, from 8 to 10 A.M., and from 2 to 4 P.M. She swabs the floors, polishes doorknobs, and assists in general ward work.

Has an average of ten convulsions per month, chiefly grand mal in type. For September she had one grand mal the 12th and 23d, two the 24th and one the 25th. Requires an average amount of supervision at all times, and special supervision following convulsions, as she frequently requires seclusion and becomes destructive and quarrelsome. Between attacks she is a very good worker under supervision.

Attends the pictures and dances regularly. Seldom goes home for a visit. Takes frequent walks with other patients and nurse. Efficiency, 30 per cent.

C. J., aged twenty-three years. Works in sewing room and occasionally runs a loom there. Averages about three hours of work per day, from 8 to 10 A.M. and 1 to 3 P.M. Arises at 5.30 A.M., makes her bed, has breakfast at 6.15, and sometimes helps in dining room for a few minutes. Goes to sewing room at 8.

Averages eight grand mal seizures per month, and is away from work the remainder of the day after a convulsion. Requires an average amount of supervision at all times. During September she had one grand mal on the 3d, two on the 8th, two petit mal on the 9th, four grand mal on the

10th, one petit mal on the 11th, two petit mal on the 14th, one grand mal on the 15th, two grand mal on the 19th, one grand mal on the 20th, 21st and 25th, two on the 26th, one petit mal on the 27th, two on the 28th, one grand mal on the 29th, and two petit mal on the 30th. Owing to the frequent seizures during the month she was away from work over half the month.

For amusement she attends the pictures and dances weekly. Goes walking with other patients. Does not go home on visits.

Considering the average number of convulsions for the year, the amount of supervision required and number of hours worked, her efficiency would be placed at 25 per cent.

A. E., aged thirty-six years. Patient works in kitchen, and averages about six hours per day. Starts work at 7 A.M., works until 11, has dinner, and goes to ward until about 4.30 P.M., when she returns to kitchen and works until 6.30, having half an hour for supper. Her work consists of cleaning and polishing kettles, steamers, brass, etc. Assists in general work of the kitchen. She is of low mentality and is not allowed to assist in cooking.

Has an average of two convulsions per month, with the exception of having status epilepticus occasionally. She must be constantly watched, as she will overeat, following which she will have status. During September she had one grand mal attack the 6th, and on the 27th was away from work the remainder of the day. She requires a great deal of supervision while she is having attacks, as she has an irritable disposition and becomes quarrelsome with other patients.

She attends the pictures weekly, and takes walks with other patients. Does not go home for visits.

While she works long hours, her work is not of a nature that requires very much mentality. She requires constant supervision at all times to keep her from having trouble with other patients.

Everything considered, her efficiency would be placed at 40 per cent.

E. F., aged forty-seven years. Works in sewing room, runs sewing machine, and averages five hours per day. Arises at 5.30 A.M., makes her bed, has breakfast at 6.15, and goes to sewing room at 8 o'clock and works until 11. Returns to work at 1 and works until 3.30 P.M. Requires small amount of supervision.

Averages two convulsions per month, having both grand and petit mal attacks. During September she had one grand mal on the 13th, and was absent for the entire afternoon; had one petit mal on the 16th, and was absent from work one-half hour. Is a fairly good worker.

Attends the pictures weekly, but not the dances. Goes home for visit about once a year. Takes frequent walks, and occasionally goes to Palmer or Springfield with nurse. Efficiency, 55 per cent.

E. F., aged sixty-eight years. Patient works in laundry, being a very good ironer. Averages about four hours per day. Begins work at 8 A.M., works until 11, and from 1 to 4 P.M. Three days per week and on Monday begins work at 1 P.M., and Thursday finishes at 11 A.M. Requires very little supervision.

Has an average of two convulsions per month. During September she had none. Her convulsions are grand mal in type, and she is absent from work for short periods following them. Has parole and takes frequent walks. Attends the pictures weekly. Occasionally visits her niece in Springfield. Efficiency, 55 per cent.

L. B., aged eighteen years. Patient works in administration building kitchen, — cleans vegetables, washes dishes and assists in general work. Averages six hours per day. Arises at 5.45 A.M., has breakfast at 6.15, commences work at 7 A.M. and works until noon; returns to ward and remains until 6, after which she goes to kitchen for an hour. Is a very capable helper.

Averages one grand mal attack per month. Is away from work about an hour following an attack. Requires small amount of supervision. When not working in the kitchen is very willing to assist the nurse on the ward, being very good help there.

Patient has outside privileges, takes frequent walks, and attends the pictures and dances regularly. Does not go home for visits. Efficiency, 60 per cent.

A. D., aged nineteen years. Patient works in the arts and crafts room when not having convulsions. Arises at 5.45 A.M., and has breakfast at 6.15. She averages from two to three hours of work per day. Is rather dull, learns slowly, and, owing to frequent convulsions, is unable to do very much work. She does the simplest kind of embroidery and some crocheting.

She has both grand and petit mal attacks, averaging twelve grand mal and six petit mal attacks per month. During September she had six grand mal and ten petit mal attacks, occurring about every other day. During October she had twelve grand mal and twenty-three petit mal attacks. Her convulsions are more frequent at time of menstruation.

Amusements consist of attending the pictures and dance weekly. Takes daily walks, and goes home for a visit once a year. Efficiency, 8 per cent.

M. P., aged forty-four years. Patient works in laundry. Arises at 5.45 A.M., has breakfast at 6.15. Her work consists of folding clothes in laundry. Works from 8 to 11 A.M. and from 1 to 4 P.M. from Monday morning until Friday noon, averaging five hours per day.

Is a fairly good worker of rather low mentality, has few convulsions (only three the past year, — two grand mal and one petit mal). During September she had none.

Amusements consist of attending the pictures weekly and taking frequent walks; goes home for visit once a year. Efficiency, 40 per cent.

J. W., aged thirty-nine years. Patient works on ward. Arises at 5.30 A.M., has breakfast at 6.15, returns to ward and begins swabbing and polishing the brass, working from 7 to 10 o'clock. Does no work in the afternoon.

Has an average of five grand mal seizures and one petit mal per month. During September she had only one grand mal attack, this being on the

3d. Requires a great deal of supervision, as she frequently quarrels with the other patients, and at times is confused and deluded following a convulsion.

Amusements consist of attending the pictures weekly. She does not attend the dances or go home for visits. Goes for walks with other patients and nurse. Efficiency, 15 per cent.

M. H., aged twenty-seven years. Patient works in dining room. Arises at 5.30 A.M., and has breakfast at 6.15. Her work consists of cleaning tables and dishes, gathering up the dishes, etc. Works from 7 to 8 A.M. and from 11.30 to 12.30 P.M., and from 5.30 to 6.30 P.M. When working she averages three and one-half hours per day.

Averages one grand mal convulsion per week; away from work the remainder of the day. During September she was away on visit from the 1st to the 24th. She had two grand mal attacks on the 26th. She is rather lazy, disinclined to do any sort of work, and constantly magnifies slight ailments. Requires an average amount of supervision at all times.

Attends the pictures and dances weekly. Takes walks with other patients, and occasionally goes home for a visit. Efficiency, 18 per cent.

J. I., aged fifty-seven years. Works on lawns in summer cutting the grass; also works on small jobs of painting. Averages five hours per day. An average day's work would consist of arising at 5.45 A.M., making his bed, having breakfast at 6.15, going to smoking room, then commencing his work at 8 o'clock and working until 11, either on the lawns or painting; off two hours for dinner, starting work at 1 o'clock and continuing until 3 or 4.

This patient works best when alone. If given a piece of work to do alone he is a very good worker, but if with other patients he invariably gets into trouble with them. He has an average of one convulsion per month, usually of grand mal type. On September 9 he had one grand mal seizure, and another on the 20th. Following these convulsions he was away from work the remainder of the day. He requires very little supervision while working, but after convulsions or when irritable he requires a great deal of supervision to prevent him from having altercations with other patients. He also sells tobacco to the employees and patients, making a little money for his personal use. Attends the dances on Friday nights and Saturday afternoons, being very fond of the square dances; also attends ball games and moving pictures.

Resents slurs and seems to imagine many. At times he has a *noli-metangere* attitude. Formerly was often in a fight, seldom now; bit another patient's thumb very seriously. Is a quick and forceful fighter, fighting like a tiger. Efficiency, 55 per cent.

W. F. D., aged thirty-seven years. Patient works with the mason, assists in mixing cement, working on stone and brickwork, excavating ditches, etc. When working he averages six hours per day. He is a very good assistant to the mason, as he can be depended upon to do various kinds of cement work accurately.

He has an average of two convulsions per month, of grand mal type and very severe. Is absent the entire day the convulsions occur, and frequently the following day. Dislocates shoulder often and is then away from work for two weeks. Needs urging to get him back. He had no convulsions in the hospital during the month of September. He requires very little supervision while working, but at time of convulsion must be given more attention, as they are so severe. Frequently before prohibition he would return from visit intoxicated, and would lose a day or two from work on this account.

Amusements consist of ball games weekly in summer and moving pictures in winter; also he attends the dances. Goes home on visit twice a year, staying from one week to two months each time. Was away from September 10 to 27.

After his attack he has semiautomatic undressing, and if out of doors runs swiftly and wildly. Apt to get on the street partly undressed. Resists any guidance or assistance, but seldom seems ill-natured.

While actually working this man is fairly efficient, but he loses a great deal of time on account of the convulsions, and still more on account of his visits home; also from dislocations. Everything considered this man's efficiency would be around 40 per cent.

E. O'C., aged twenty years. Was seven years old when he had his first fit. He was smoking one package of cigarettes daily. He came here in 1915. He was very much inclined to fight, and resented other patients getting near him. He would strike a patient in the face. He ran away from the hospital several times, but his family prevailed upon him to return. He has rather a large head; got as far as the seventh grade in education; shows lack of judgment; is very obstinate and set in his opinions; has enormous appetite; says he can tell when his fits come on by a feeling of nervousness. He sometimes has six attacks in a day, but has had remission lasting a great many months.

During the war he ran away from here and was heard of wearing some kind of a uniform belonging to a Canadian branch of the army. He telephoned to the hospital that he wanted to come back, and after a few weeks he did so, but he was not willing to go on the wards, and it was not thought desirable to put him in a cottage at once, although he had been there formerly. He is said to have injured his mother while at home. There were times when he would work fairly well, but could not do anything by himself, had no capacity for staying on his job, gets flighty and thinks of something else he wants to do — really, very lazy. During his best periods, when he was having no epileptic attacks, the only effort he would make would be that of working on a team or working with a group of men where he could stand about most of the time. He liked to talk a great deal, seemed perfectly capable of doing work, but accomplished almost nothing. After his return to us in his Canadian uniform he disappeared and has not been heard from since. His efficiency would be rated at 10 per cent.

Women.

| WARD. | Number of Patients. | Admin-istration Build-ing. | Dining Room. | WARD WORKERS. | | Floor Polish-ers. | Non-workers. | Em-ployees' Cottage. | Sewing Room. | Kitchen Build-ing Kitchen. | Laun-dry. | O Cottage. | Nurses' Home. | Mangle Room. |
|----------------------|---------------------|----------------------------|--------------|---------------|-----------|-------------------|--------------|----------------------|--------------|----------------------------|-----------|------------|---------------|--------------|
| | | | | 1st Grade. | 2d Grade. | | | | | | | | | |
| Women's Hospital A | 28 | 2 | 1 | 2 | - | - | - | - | 6 | 3 | 9 | 2 | 2 | 1 |
| Women's Hospital B | 30 | - | 2 | 4 | 3 | 4 | 4 | - | - | 4 | 5 | - | - | 4 |
| Women's Hospital C | 29 | - | 1 | 6 | - | 2 | - | 2 | - | 10 | 7 | - | 1 | - |
| Women's Hospital D | 39 | - | 4 | 10 | 5 | 8 | 10 | - | - | - | 2 | - | - | - |
| Women's Sanitarium A | 34 | - | 4 | 9 | 3 | 3 | 3 | - | 4 | 4 | 4 | - | - | - |
| Women's Sanitarium B | 37 | - | 3 | 8 | 2 | 6 | 5 | - | 4 | - | 9 | - | - | - |
| Women's Sanitarium C | 36 | - | 5 | 7 | 2 | 4 | 2 | - | 4 | 4 | 8 | - | - | - |
| Women's Sanitarium D | 32 | - | 2 | 7 | 11 | 4 | 7 | - | 1 | - | - | - | - | - |
| Infirmary, Men | 23 | - | 2 | 6 | 3 | 2 | 1 | - | 3 | 5 | - | - | - | 1 |
| Infirmary, Women | 25 | 1 | 2 | 4 | 2 | 1 | - | - | 5 | 2 | 7 | - | 1 | - |
| O Cottage | 40 | - | - | - | 10 | 6 | 24 | - | - | - | - | - | - | - |
| M Cottage | 28 | - | 2 | 6 | 5 | 6 | 8 | - | - | - | - | - | - | 1 |
| G Cottage | 34 | - | 3 | 5 | 2 | - | - | - | 6 | 4 | 9 | 2 | - | 3 |
| | 415 | 3 | 31 | 74 | 48 | 46 | 64 | 2 | 33 | 36 | 60 | 4 | 4 | 10 |

Men.

| WARD. | Number of Pa- tients. | Laundry. | Roads. | Store. | WARD WORKERS. | | Floor Polishers. | Non-workers. | Yard Men. | Dispensary. | Bakery. | Bath House. | Green House. | Dining Room. | Industrial Shop. | Kitchen Build- ing Kitchen. | Clough Kitchen. | Clough Dining Room. | Paint Shop. | Administration Building Kitchen. |
|--------------------|--------------------------|----------|--------|--------|------------------|-----------|------------------|--------------|-----------|-------------|---------|-------------|--------------|--------------|------------------|--------------------------------|-----------------|------------------------|-------------|--|
| | | | | | 1st Grade. | 2d Grade. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| Men's Hospital 1 . | 22 | 2 | 1 | - | 2 | - | 4 | 1 | 2. | - | - | 1 | - | 2 | 2 | - | 3 | - | 2 | - |
| Men's Hospital 2 . | 30 | - | 4 | - | 2 | 9 | 13 | - | - | - | - | - | - | 2 | - | - | - | - | - | - |
| Men's Hospital 3 . | 22 | - | - | - | 2 | 2 | 11 | 1 | 2 | - | 2 | - | - | 1 | - | - | - | - | - | - |
| Men's Hospital 4 . | 32 | - | - | - | 2 | 5 | 7 | 17 | - | - | - | - | - | 1 | - | - | - | - | - | - |
| Clough Building 1 | 20 | 1 | - | - | 3 | 2 | - | - | - | - | 2 | - | 1 | - | 6 | 2 | - | 1 | 1 | 1 |
| Clough Building 2 | 27 | 7 | 3 | - | 5 | 4 | 3 | - | 1 | - | 1 | - | 1 | - | - | - | - | 2 | - | - |
| Clough Building 3 | 22 | 3 | 1 | 1 | 3 | 1 | - | - | - | - | 4 | 1 | - | - | - | 1 | 2 | 4 | 1 | - |
| Clough Building 4 | 28 | 6 | - | - | 2 | 8 | 3 | 1 | 3 | - | 1 | - | - | - | - | - | 1 | 1 | 2 | - |
| Hyde Cottage . | 24 | 1 | - | 1 | 1 | 2 | - | - | - | 1 | 3 | - | 3 | - | 9 | - | 2 | 1 | - | - |
| | 227 | 20 | 9 | 2 | 22 | 33 | 41 | 20 | 8 | 1 | 13 | 2 | 5 | 6 | 17 | 4 | 8 | 9 | 6 | 1 |

THE PROGNOSIS AND TREATMENT OF EPILEPSY.

BY MORGAN B. HODSKINS, M.D.,

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The cases upon which the following observations are based — 478 in number — are taken from the records of the Monson State Hospital. In this analysis all cases were eliminated which showed any co-existing complications such as organic brain diseases and all cases showing pronounced mental defects, thereby obtaining as far as possible cases of the idiopathic diseases, so called.

The minimum period of arrest has been fixed at two years.

The total number of admissions to the hospital during the first ten years of its existence was 1,665. Of this number, 1,187 have been eliminated for the reasons stated above, leaving 478 cases. Of this number the disease has been arrested in 14, giving a percentage of arrests of 2.9 per cent. The percentage of arrests given by other writers varies from 4 to 12 per cent. Much of the discrepancy in the statistics depends on the definition of an arrest or cure, and also on the diagnosis.

Of the 1,665 cases 817 were either foreign born or children of foreign-born parents.

The prognosis of the disease and the conditions which influence it will be considered under the following headings: (1) age at onset of the disease; (2) duration of the disease; (3) frequency of the seizures; (4) influence of a hereditary predisposition; (5) influence of sex; (6) character of the fits.

1. *Influence of Age at Onset.* — The conclusions to be derived from a study of the cases with this point in view is, that epilepsy commencing under ten years of age is least favorable for arrest and most favorable for the production of the confirmed disease. Moreover, a great proportion of the cases in which the onset was before the age of ten show a pronounced mental defect. In those in whom the onset was between the ages of ten and fifteen are found the greatest percentage of arrests and the least number of confirmed cases and the least mental impairment.

Those beginning after the age of fifteen did not show a single case of arrest, and in most of these the disease was steadily progressive and tended to profound dementia.

My experience with senile epilepsy is that the prognosis is very unfavorable. This last point is the direct opposite of the experience of most others.

2. *Duration of the Disease.* — Speaking generally, the earlier the case is brought under treatment the more hopeful the prognosis and the greater the probability of improvement. There is a better prospect of improvement during the first five than during the second five years of the disease.

In the cases that have a duration of less than five years there is a considerably larger number with no mental impairment.

Arrest of the fits may take place after a duration of ten years or more. A case of arrest has been reported after a duration of fifty years, but as a rule, after a duration of ten or fifteen years the case may be put down as practically a hopeless one.

Although the duration of the epilepsy is a potent factor in determining the mental condition, it should be noted that in some cases there is no obvious mental defect even after a duration of twenty or thirty years.

3. *Frequency of the Seizures.* — Most observers have made the point that the longer the intervals between the attacks the better the prognosis. In my experience, those cases that go two or three months between the fits are the most discouraging ones to treat.

The smallest number of arrests and the greatest number of confirmed cases with mental impairment are found among those that have fits daily or several weekly.

The following general statement may be made: There is a direct relationship between the frequency of the seizures and the mental impairment. The more frequent the attacks the more common and profound the dementia. The frequency of the seizures illustrates the severity of the disease.

The most favorable cases are those that do not have more than from one to four attacks a month.

4. *Influence of a Hereditary Predisposition.* — The only hereditary maladies taken into consideration were epilepsy and insanity. Other observers state that "there is as great a chance of arrest in those who have, as in those who have not, a family history of epilepsy or insanity." In none of our arrested cases was there a family history of epilepsy or insanity, and at the hospital we look upon the cases showing heredity as being the least favorable for improvement or arrest.

5. *Influence of Sex.* — Sex seems to play a very small part in the prognosis of epilepsy. In this series the arrests were divided as follows: 8 males and 6 females.

In regard to the influence of the disease on the mental condition, males seem to dement more rapidly and to a more profound degree than the females.

6. *Character of the Fits.* — The kind of attack modifies the prognosis to some extent, the grand mal being more readily influenced by treatment than the petit mal.

The cases that have attacks exclusively of the petit mal type are very unfavorable both as to arrest or improvement.

Moreover, those cases that have frequent minor attacks dement more rapidly than those that have several major attacks each week. The prognosis is also less favorable in the cases that have both major and minor attacks than in those that have major attacks alone.

The treatment of epilepsy requires to be considered from several different points of view. Therefore it seems to me convenient to divide the treatment as follows: —

1. Prophylaxis.
2. Treatment at onset of the disease.
3. Treatment in colonies.
4. Surgical treatment.
5. The education of epileptic children.

The preventive treatment of epilepsy can only be carried out successfully in childhood and early youth.

The symptoms may be many and varied. In the convulsions at teething, or as a result of some of the acute, infectious fevers, intestinal worms, indigestion, etc., are found danger signals of the utmost value, as indicating a tendency to convulsions which may, if the child is not properly safeguarded, develop into epilepsy in later years.

Allied to these frank symptoms, and perhaps of equal importance, are night terrors, sleep walking, outbursts of temper, choreiform movements.

The management of these children is based on broad, hygienic and dietetic lines.

Overexertion in any form, whether at work or play, should be guarded against.

In regard to diet, milk should form the staple article associated with other easily digested and nourishing foods.

It does not seem to me to be advisable to resort to a drug treatment unless there is some very special indication for it. These measures should be supplemented by long periods of rest from school work.

Treatment at Onset of the Disease. — Although the treatment of epilepsy is probably best carried out in a hospital, there is a certain number of cases where this is impossible. In these cases, proper treatment should be instituted and continued for a period of several years. For medical treatment in these cases probably the best drug is some one of the bromides, my preference being for the sodium salt. This should be given in sufficiently large doses to control the fits. The symptoms of Bromidism are materially lessened by hot-tub and hot-air baths.

The bromides may be administered by the mouth or by the salt starvation method. I prefer to administer by the mouth.

Many other drugs have been recommended, but I must confess that they have never been of use in my hands.

As to diet, after trying all the different combinations that I have ever seen recommended, I have come to the conclusion that a mixed diet, eliminating the indigestible foods, is the best.

It is necessary to indicate some general hygienic points which should be carried out not alone, but in conjunction with the prescribed medicinal and dietetic measures. The importance of violent physical exercise has been emphasized, and under any circumstances a certain amount of exercise in the open air is necessary, such as walking, running, tennis, and, for the men, baseball.

It goes without saying that alcohol and tobacco should be prohibited.

Surgical Treatment. — Cases of epilepsy, from the surgical aspect, resolve themselves into the following divisions: —

1. Epilepsies associated with reflex (peripheral) irritation.
2. Jacksonian epilepsies.
3. Traumatic epilepsies.

Under the first heading are included those cases of epilepsy which have some local irritations, so called, in the peripheral organs, more especially the eyes, ears and genital organs, although no part of the body is necessarily exempt. Many observers have laid especial stress on some anomaly of the eye, either muscular or refractive, as being the causal factor in many cases, and the tendency seems just now to ascribe the trouble more to

refractive than to muscular difficulties. Three years ago at the hospital we atropinized the eyes of 88 epileptics, and kept them with the accommodation fully suspended for over a month, with no improvement as regards the convulsions.

In regard to the pathologic conditions in other organs, while it is always well to remove them as it manifestly contributes to the general comfort of the patient, I have never seen such a removal cause an arrest of the fits.

Jacksonian Epilepsies. — We have several patients in the hospital who have seizures of this type and who have had the skull opened, but without benefit. I do not know of a case of Jacksonian epilepsy (barring the tumor or cyst cases) that has been relieved by an operation.

If in the following some one would cite a case in point I would be very grateful.

Traumatic Cases. — Under this heading are included cases of epilepsy arising from obvious traumatic lesions, such as fractures of the skull, gunshot wounds or other coarse damage to the brain. In these the question of operation has to be decided on within a short time, and is of surgical interest. But when these cases have been neglected and have gone on for a period of over two years, the chances of improvement are very slight.

Colony Treatment and Education. — In speaking of the treatment of epilepsy, Spratling says: "We may start with the following proposition, applicable, without exception, to every case alike. The more absolutely the physician is permitted to control the patient in every respect the more promising the hope of amelioration or cure."

This statement being true, how much better the patient can be controlled in an epileptic colony than if he be allowed to remain among sympathetic relatives.

An epileptic person living at home is usually ruler of the family. He is allowed to have his own way in everything, and very soon gets beyond control.

He seldom if ever is taught to control his emotion. He is wilful, and if opposed in any way is apt to become very angry. During a fit of anger he may lose all control of himself and commit deeds of the gravest character. The parents must not be blamed too much for this condition of affairs, for the patient, being the afflicted member of the family, is by nature bound to receive the greater part of the parents' love and care. The rest of the children are taught to humor him in every way and the

parents are unable, partly on account of love and sympathy, and partly through fear of aggravating the disease, to properly train and discipline him.

An epileptic should be very regular in his habits. There should be a certain amount of time reserved for sleep, work and play each day. At home this regularity is very hard to obtain, especially after the patient has reached the age of fifteen or over.

At home the patient is seldom taught any useful occupation, and as his time is not taken up, he has a great opportunity to brood over his misfortune.

The patient's social life and that of the family is greatly restricted.

It is a well-known fact that epileptics are large eaters, and that they generally eat anything they wish and at any time. It is almost impossible to regulate their diet at home.

At home the medical treatment is seldom carried out properly. The patient or his family gets the idea that the treatment is useless, therefore they leave it off for a month just to see if the patient will grow worse.

In a colony the patient can be occupied in some useful way, such as printing, shoemaking, tailoring, gardening and other occupations. There he has little time to brood over his trouble. He soon finds companions with whom he can associate. Entertainment is furnished by dances, parties, readings, concerts and athletic sports. His diet and hours can be regulated and proper medical treatment administered.

Epileptic colonies usually have fairly good schools in connection, so that children, who have previously been denied the privilege of school on account of their disease, may receive at least a common school education.

Parents often bring their children to Monson with a story like this: "I can do nothing with my boy at home. He will not obey me. I cannot send him to school as he frightens the other children. I cannot keep him off the streets, and he goes with a class of boys with whom I do not like to have him associate."

Let such a boy be sent to a colony and in a short time he is an entirely different individual. He learns to obey the rules. He also learns how to take care of himself in regard to diet, cleanliness and to keep regular hours. He becomes interested in some employment, and very often is able to master some useful trade.

An epileptic is, as a rule, discontented wherever he is, no

matter how much is done for him, but I think generally he is more contented in a colony than at home. Very often we have patients return from vacations after having used up only a small part of the allotted time, saying that there was nothing to do at home and they were lonesome.

If the patient be placed in a colony for care and treatment, the parents and family doctor should allow the colony authorities to have entire control of the patient, as only in this way can discipline and regularity be obtained. It is a distinct disadvantage for the parents or friends to make frequent visits to the hospital, as the patient is often made discontented by stories brought by them from the outside world.

We have many patients at Monson who only stay long enough to get into good condition, and then their parents or friends take them home, only to return them after a time in a worse condition.

742

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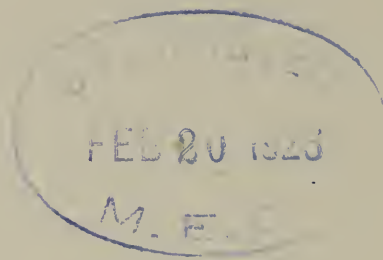
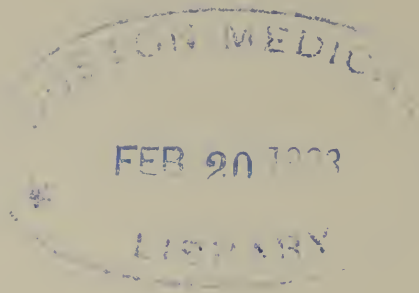
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WALTER E. FERNALD, M.D.

GEORGE M. KLINE, M.D.

OCTOBER, 1921



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CONTENTS.

| | PAGE |
|--|---------|
| Schematic Classification of the Diphtheroid Group | 5-24 |
| W. WENDELL FRAY, M.S., M.D., Interne in Bacteriology, Massachusetts State Psychiatric Institute. | |
| The Necessity of maintaining Proper Standards of Nursing Care | 25-34 |
| ELISHA H. COHOON, M.D. | |
| The Boston Medical and Surgical Journal, Vol. 184, No. 2, Jan. 13, 1921. | |
| A Note on the Preservation of Cells in Spinal Fluid as measured by the Cell Count | 35-40 |
| C. J. CAMPBELL, M.D., L. M. DAVIDOFF, M.D., and G. P. GRABFIELD, M.D. | |
| The Boston Medical and Surgical Journal, Vol. 185, No. 22, Dec. 1, 1921. | |
| The Care of Neuro-Psychiatric Disabilities | 41-55 |
| DOUGLAS A. THOM, M.D., and H. DOUGLAS SINGER, M.D. | |
| Reprint No. 704, from the United States Public Health Reports, Oct. 28, 1921. | |
| What an Adequate Mental Hygiene Program involves for the State Hospital System | 56-60 |
| GEORGE M. KLINE, M.D. | |
| American Journal of Insanity, Vol. 77, No. 3, January, 1921. | |
| Mental Hygiene | 61-65 |
| WALTER E. FERNALD, M.D. | |
| The Boston Medical and Surgical Journal, Vol. 183, No. 27, Dec. 30, 1920. | |
| The Effects of Syphilis on the Families of Syphilitics seen in the Late Stages | 66-86 |
| HARRY C. SOLOMON, M.D., and MAIDA H. SOLOMON, A.B., B.S. | |
| Social Hygiene, Vol. VI, No. 4, October, 1920. | |
| Mental Responsibility and Petty Crime | 87-100 |
| DOUGLAS A. THOM, M.D. | |
| The Boston Medical and Surgical Journal, Vol. 185, No. 14, Oct. 6, 1921. | |
| A Note on the Pathology of the Choroid Plexus in General Paralysis | 101-104 |
| A. E. TAFT, M.D. | |
| Archives of Neurology and Psychiatry, February, 1922, Vol. VII, pp. 177-182. | |
| Pathology as related to Psychiatry | 105-116 |
| JAMES V. MAY, M.D. | |
| The State Hospital Quarterly, August, 1921. | |
| Proposed Reorganization and Consolidation of State Institutions in Massachusetts | 117-130 |
| GEORGE M. KLINE, M.D. | |
| American Journal of Insanity, Vol. 76, No. 3, January, 1920. | |

SELECTED MEDICAL AND SCIENTIFIC STUDIES.

SCHEMATIC CLASSIFICATION OF THE DIPHTHEROID GROUP.*

BY W. WENDELL FRAY, M.S., M.D.

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1919-1922.

For several years the writer has been interested in the classification of bacteria from the standpoint of the value accruing from its use as a practical identification index. Such an index would ignore genetic relationships and would seek to identify an unknown organism by name by the most direct route consistent with accuracy.

Much work has been done recently on the differential cultural characteristics of isolated groups of bacteria or portions of such groups. There has been no evidence, so far as the writer is aware, of an attempt to synthesize the whole into a working scheme to permit easy identification of an "unknown," showing at once the similar and differential features of the organism. The use of any of the books on differential bacteriology would lead one hopelessly astray. This must be apparent to all who have tried identification work in a thorough fashion.

The following is an attempt to show how this scheme may be adapted to the diphtheroid group, and is a fragment of the larger work covering the classification of all the more common bacteria. The members of the diphtheroid group are Gram positive, non-spore bearing bacteria which stain readily, show considerable pleomorphism and irregular staining, are aerobic and facultatively anaerobic, and, usually, though not invariably, are non-liquefying, non-motile and non-gas forming. The rods are slender, often curved and show a tendency to club formation. Branching has been reported in older cultures. They are not acid fast. They will usually grow on unenriched media though often much more copious groups are obtained through the addition of serum, blood or sugar.

* Original article.

Before passing to the classification the writer wishes to express his thanks to Dr. Myrtelle M. Canavan, whose support and advice have proved most valuable in the prosecution of this work.

SCHEMATIC INDEX OF THE DIPHTHEROID GROUP.

I. No liquefaction of gelatine.

A. Dextrose always fermented; saccharose never fermented. Polar bodies present; typical diphtheria morphology with characteristic involution forms. Amount of growth, medium to heavy.

(a) Virulent with strong exotoxin. Dextrin and maltose characteristically fermented. *Corynebacterium diphtheriæ* (Loeffler).

(b) Avirulent; soluble toxin absent. Maltose usually fermented; dextrin not fermented. *Coryn. flavidus* group.

1. Dry growth on blood and serum media. Colonies firm and adherent. Sinking friable pellicle on broth. Growth may or may not be pigmented yellow. Growth occurs at room temperature. *Coryn. flavidus* (Morse).

2. A diphtheroid identical with *Coryn. flavidus* except for its smaller size, its more slowly developing colonies on plain media, its marked hemolytic action on blood agar, and its more invasive pathogenic properties. *Coryn. pseudotuberculosis* (Kutscher).

3. A very pleomorphic diphtheroid with acid-fast granules. Growth absent at room temperature. Broth clear without a pellicle. Growth at first moist; later dry and granular. *Coryn. avirulens*.

4. Growth not dry or adherent. Pellicle on broth. Grows at room temperature. *Coryn. muris* (Klein).

B. Dextrose and saccharose both fermented.

(a) Maltose fermented; dextrin not fermented. Diphtheria-like morphology; scanty, dry, adherent growth. Polar bodies large and irregular usually. No soluble toxin formed. *Coryn. xerosis* group.

1. Colonies are very slow growing; do not attain size of diphtheria bacillus even on glucose or serum media. Morphology resembles diphtheria bacillus closely. *Coryn. xerosis* (Kuschbert).

2. Colonies larger and more opaque than those of diphtheria bacillus. The organism is longer and wider than *Coryn. diphtheriæ*. Growth not dry and adherent like *Coryn. xerosis*. *Coryn. maculatus* (Graham-Smith).

(b) Maltose characteristically fermented: dextrin irregular. Abundant growth even on the plain media. Growth not dry or adherent. Small, imperfect metachromatic granules. No soluble toxin formed.

1. Smaller than *Coryn. diphtheriæ* in size, with small, imperfect granules. Growth abundant and salmon-pink on Loeffler's and potato. *Coryn. hoagii* (Morse).

2. Large, barred diphtheroid, often with tapering ends. Granules well formed. Larger and heavier than *Coryn. diphtheriæ*. Growth on serum media yellow-white rather than salmon-pink. It is said to be the saprophytic form of *Coryn. hoagii*. *Coryn. paralyticans* (Ford-Robertson).

3. Diphtheroid of average size with well-marked polar bodies. Growth takes place more slowly than the other members of this group and is more sticky and tenacious, particularly on gelatine. It is non-chromogenic and avirulent. Fermentative reactions incomplete. Indol is formed. *Coryn. auris* (Graham-Smith).

C. Dextrose and saccharose not fermented or occasionally dextrose alone fermented.

(a) Diphtheroid of characteristic *Coryn. diphtheriæ* morphology, producing a heavy, abundant growth on plain media. Sugars not fermented. Most characteristic is the production of a soluble toxin not neutralized by diphtheria antitoxin. *Coryn. ruedigeri* (Mellon).

(b) Characteristic diphtheria morphology present; metachromatic granules usually present. Amount of growth variable, white-yellow. No toxin formed. *Coryn. ceruminis* group.

1. Slender, long, slightly curved diphtheroid with polar bodies. Abundant, yellow-white growth forms on the simple media. No growth occurs in gelatine stab but on potato it is present. Sugars not fermented. *Coryn. ceruminis* (Graham-Smith).

2. An irregular, thread-like or bipolar staining diphtheroid, Gram variable with Gram positive metachromatic granules. Involution forms occur. Growth is limited; colonies remain small and discrete even on enriched media. Slow growth occurs on gelatine and potato. Sugars not fermented. *Coryn. trichodiphtheroide* (Miller).

(c) Characteristic *Coryn. diphtheriæ* morphology lacking. Neisser granules absent. Amount of growth variable, white-yellow. No soluble toxin formed. Non-pathogenic. *Coryn. hoffmani* group.

1. A short, oval diphtheroid with a central unstained septum. Metachromatic granules absent. Abundant, yellow-white growth on the plain media. Sugars not fermented. *Coryn. hoffmani* (Loeffler-Hoffman).

2. A short, oval diphtheroid with polar bodies absent. Growth on plain media very scanty. Sugars not fermented with the exception of dextrose. *Coryn. meningitidis*.

D. Fermentative reaction of a very wide range. Pleomorphism extreme.

(a) A pleomorphic diphtheroid showing both coccoid and bacillary forms. Capsule in animal body. It clots milk, grows well on gelatine, but produces no growth on potato. It is slightly pathogenic for rabbits. *Coryn. enzymicus* (Mellon).

(b) A diphtheroid showing bipolar granules; often resembling *Coryn. hoffmani*, with a light central septum. A good non-chromogenic growth forms on the simple media. Growth on potato is almost invisible. It ferments dextrose, lactose, maltose and saccharose. Non-pathogenic. *Coryn. coryzæ-segmentosus* (Cautley).

(c) A long, pleomorphic diphtheroid, lacking the extreme morphological variations of *Coryn. enzymicus*. Polar bodies are present in many cultures (especially serum). Milk is not clotted except by boiling. Growth is slight on potato and gelatine. It ferments all of the more common sugars and is avirulent. *Coryn. hodgkini* (Bunting and Yates).

II. Liquefaction produced in gelatine.

1. A motile, Gram variable, short, regular diphtheroid, showing polar bodies. Growth on plain media is abundant. Rapid, infundibuliform liquefaction is produced in the gelatine stab, acid and clot formation in litmus milk. Indol is formed; nitrates not reduced. It ferments none of the sugars. Local abscesses produced in guinea pigs. *Coryn. mobilis*.

2. A slender, non-motile, diphtheroid, barred, solid or showing Neisser granules. Growth is abundant on the plain media. A gray-green growth is produced on agar, discoloring the medium dark brown or purple. Its pathogenicity is negative or slight. *Coryn. chromogens*.

3. A long, curved diphtheroid, showing Neisser granules but not segmented commonly. Motile during phases of its development. Growth on plain media abundant. A slow crateriform or infundibuliform liquefaction is produced in the gelatine stab, a reduction and often a clot in litmus milk. Indol is formed; nitrates are reduced. It ferments dextrose and at times lactose. Non-pathogenic. *Coryn. diphtheroides-liquefaciens* (Graham-Smith).

CORYNEBACTERIUM DIPHTHERIÆ (KLEBS-LOEFFLER) LEHMANN AND NEWMANN.

(Synonymy: *Bacillus diphtheriæ* Klebs; *Bacterium diphtheriæ* Flügge.)

Differential Characteristics. — A slender, gracefully curved rod, barred, solidly stained or showing polar bodies. Clubbed and other atypical forms in older cultures. Branched forms rare. Amount of growth produced on plain media greater than that of *Coryn. xerosis*, but less than that of *Coryn. hoffmanni*. It ferments dextrose, maltose, dextrin, but fails to ferment saccharose. It is highly virulent and produces a soluble toxin.

Morphology. — Non-motile, slender, straight or slightly curved rods. Width of cell, 0.3–1.1 μ . Length of cell, 1.2–6.4 μ . Not of uniform thickness throughout, bulge at ends. Branched forms are rare. Club and atypical forms in older cultures.

Staining. — Gram positive. Irregularity of staining with Loeffler methylene blue. "Polar bodies" also barred types. Neisser's stain used to bring out polar bodies.

Conditions of Growth. — Range of growth 19° to 42° C. Optimum temperature 37.5° C. Will grow anaerobically in presence of carbohydrates, but shows a marked preference for aerobic conditions. Thermal death point, 58° C. for ten minutes. Resists freezing and drying well. Will grow on extract media. Growth much increased by addition of serum, blood or carbohydrates.

Meat Infusion Agar. — Colonies first appear in twenty-four to thirty-six hours as translucent colonies. These are more characteristic as to type than those on Loeffler's. Surface colonies: irregularly round or oval shaped; central nucleus fringed by a loose, coarsely granular disc. In isolating, the irregular edge of the diphtheriæ bacillus can be readily told from the smooth edge of streptococcus.

Meat Infusion Gelatine. — A good medium, but low temperature prevents any considerable growth.

Gelatine Stab. — No liquefaction. Scanty growth. Line beaded with white punctiform colonies.

Agar Slant. — Growth not as good as on Loeffler's. Growth gray and translucent.

Litmus Milk. — No change but a good medium.

Potato. — Poor medium; gray-white growth; no growth on acid potato.

Loeffler's Serum. — Rapidly forming colonies, appearing in twelve to

twenty-four hours. Minute, gray-white, glistening, rapidly enlarging, outgrowing the streptococcus. The colonies, however, are less characteristic than those on agar.

Broth. — Good growth at surface where a pellicle forms. Broth remains clear.

Action on Carbohydrates. — Dextrose, dextrin, maltose, levulose, galactose, acid without gas. Saccharose, mannite, dulcitol, not fermented. Lactose variable.

Products. — Indol negative. Some ammonia formed. Nitrates reduced.

Pathogenesis. — Guinea pigs most susceptible. 0.5 c.c. subcutaneously, fatal in twenty-four to seventy-two hours. Intraperitoneal, less severe, fatal fourth or fifth day. Rabbits much less susceptible. Dogs, cats and cows also susceptible. Pigeons and fowls subcutaneously (1 c.c.), fatal in sixty hours or less. Rats and mice immune.

Source. — Causal agent of diphtheria.

References. — Klebs, Verhandl. Congr. für inneren Medizin, 1883, 143. Loeffler, Mittheil. a. d. Rais. Gesundheit. 2, 1886, 421.

CORYNEBACTERIUM FLAVIDUS (MORSE).

(Synonymy: *Bacillus flavidus* Morse.)

Differential Characteristics. — A diphtheroid of typical Coryn. diphtheriae morphology, often with clear-cut bars or large, irregular Neisser granules, producing a dry growth on blood and serum media, a sinking, friable pellicle on broth. It always ferments dextrose and usually maltose and glycerine. It never ferments saccharose. Somewhat pathogenic for guinea pig, but no soluble toxin is formed.

Morphology. — Larger than *Bacillus hoagii*. Thick forms with clear-cut bars predominate; Neisser's granules very large and irregular. Involution forms in older cultures.

Blood Agar Colonies. — Yellow, spreading, adherent, wrinkled or corrugated radially. A few show concentric wrinkling. A few strains are hemolytic.

Agar Slant. — Dry, granular, more luxuriant than *Bacillus xerosis*. May or may not be pigmented.

Loeffler's Medium. — Heavy; color, white-yellow; often dry and granular.

Broth. — Usually a pellicle, friable, falling to bottom of tube on agitation.

Action on Carbohydrates. — Dextrose always fermented. Maltose and glycerine usually fermented. Saccharose never fermented. Dextrin not fermented.

Pathogenesis. — Pathogenic for guinea pigs, but does not produce the lesions of diphtheria. Relatively avirulent.

Reference. — Morse, Jour. Infectious Dis., 11, 1912, 253.

CORYNEBACTERIUM PSEUDOTUBERCULOSIS (KUTSCHER).

(Synonymy: *Bacterium pseudotuberculosis* Kutscher; *Bacillus* of caseous lymph adenitis; *Bacillus* of Preiz-Noeard.)

Differential Characteristics. — A short, thick diphtheroid, smaller than *Coryn. flavidus*. Polar bodies are present. Its colonies are much more slowly growing, appearing only after four to five days on plain agar. It is markedly hemolytic on blood agar. It is more highly pathogenic than *Coryn. flavidus*. Except for these features it seems to be identical with it.

Morphology. — Non-motile. Single, in pairs and threes. Variable in shape. Short, thick, with rounded ends. Width of cell, $0.5\ \mu$. Length of cell, $1.3\text{--}1.6\ \mu$. Ends may be swollen, clubbed with metachromatic granules. Often with oval, refractile bodies resembling spores. Branching forms present. No capsule.

Staining. — Gram positive. Stains well with methylene blue and carbol-fuchsin. Does not stain with Neisser's stain.

Conditions of Growth. — Optimum at 37.5°C . Grows very slowly at 20°C . Aerobic and facultatively anaerobic. Aerobic conditions preferred. Grows slowly on plain agar. Thermal death point, 60°C . for five minutes.

Agar Colonies. — Appear as gray-white points in four to five days, reaching maximum development in twelve days, when they are round, 4 to 6 mm. in diameter, thick, white, shiny, wax-like, slightly granular surface, with suggestion of concentric rings. Border crenated; center papillated.

Gelatine Stab. — At 20°C . not a favorable medium. No liquefaction. Moderate granular growth.

Agar Slant. — Colonies become confluent, dry and adherent. Grows well but slowly.

Litmus Milk. — No visible change. Growth is present.

Potato (Acid). — Gray-white, moist, spreading, often hardly visible.

Loeffler's Medium. — Heavy, moist, golden-yellow growth.

Blood Agar. — Markedly hemolytic. Circular, umbonate, ochraceous or cretaceous, opaque (eight to ten m.m. after several days). Concentric rings about a papillated center. Growth friable.

Broth. — General turbidity, clearing later. Scaly, gray-white, greasy looking pellicle on surface adhering to sides.

Action on Carbohydrates. — Dextrose and maltose, acid, no gas. Lactose, saccharose, dextrin, mannite, glycerol not fermented.

Products. — Indol negative. Nitrates not reduced.

Pathogenesis. — Fatal in guinea pigs intravenously or intraperitoneally. Subcutaneously the adjacent lymph nodes become caseated. Rabbits and mice are also susceptible. Pigeons are immune.

Source. — Associated with caseous lymph adenitis in sheep.

References. — Kutscher, *Zeitschr. f. Hyg.*, 18, 1894, 327. Reed, Johns Hopkins Rep., 9, 1901, 525. Hall and Stone, *Jour. Inf. Dis.*, 18, 1916, 195.

CORYNEBACTERIUM AVIRULENS.

Differential Characteristics.—A very pleomorphic diphtheroid with acid granules, often bipolar in position. It produces a dry, granular, non-chromogenic or slightly yellowish growth on the plain media. It produces no growth on potato and leaves litmus milk unchanged. Broth remains clear with a slight sediment. It is non-pathogenic. It ferments dextrose, maltose and glycerine but not saccharose or lactose.

Morphology.—Very pleomorphic; acid-fast granules; short forms in pairs resembling cocci are common in young cultures. Also slender rods staining like diphtheria bacillus but with bipolar acid-fast granules with T. B. stains. Size, 1.5–2 x 0.2–0.3 μ .

Staining.—Gram positive. Stains readily. Polar granules, etc., are acid fast.

Conditions of Growth.—No growth 18° to 21° C. Ascitic fluid or brain tissue enhances growth. Aerobic and facultatively anaerobic. Thermal death point, ten minutes at 60° C.

Agar Colonies.—Visible in forty-eight hours, moist, transparent, colorless gray-white, 0.5–1 mm. in diameter at end of the first week. May become confluent after prolonged cultivation. Surface dry and rather granular, edges are irregular.

Gelatine Stab.—Not stated.

Agar Slant.—Growth along puncture for a depth of 4 cm.

Litmus Milk.—Unchanged.

Potato.—No growth.

Loeffler's Medium.—More opaque and whiter colonies with yellowish tint often.

Broth.—Remains clear. No pellicle. Sediment present.

Action on Carbohydrates.—Dextrose, maltose, glycerine rendered acid. Lactose, saccharose, raffinose, mannite, inulin not fermented.

Pathogenesis.—Non-pathogenic for Japanese waltzing mice, rabbits, guinea pigs and white rats.

Source.—Case of tubercular leprosy (epitrochlear lymph node).

Reference.—Wolbach and Honeij, Jour. Med. Res., 30, 1914, 1.

CORYNEBACTERIUM MURIS (KLEIN).

(Synonymy: *Bacterium muris* Klein).

Differential Characteristics.—A fairly short diphtheroid, usually showing an unstained band but polar granules are present. Growth on media not dry or adherent. Pellicle absent on broth. Grows at room temperature. Ferments dextrose and maltose but not lactose or saccharose. It is avirulent.

Morphology.—Non-motile, short bacillus, 1.5–2.5 μ in length. Most organisms are with unstained band. Polar granules present; some with 2–3 bands unstained, some solid forms nearly always present.

Staining.—Gram positive.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at both room and incubator temperature.

Gelatine Stab. — Granular line along puncture. No liquefaction.

Agar Slant. — Very small, white, granular colonies with smooth border and but little tendency to coalesce.

Litmus Milk. — No change.

Potato. — No growth.

Loeffler's Medium. — Similar to those on agar but larger.

Broth. — Cloudy, twenty-four hours.

Action on Carbohydrates. — Acid in dextrose and maltose. Saccharose and lactose not fermented.

Pathogenesis. — Pathogenic for wild mouse, guinea pig, white and domestic rat. Fatal intraperitoneally. Septicæmia produced.

Source. — Pneumonia in rats.

References. — Klein, Lancet, 1, 1903, 238. Klein, Centr. 1, Bakt., abt. 1, 33, 1903, 488. Mitchell, Jour. Inf. Dis., 10, 1912, 17.

CORYNEBACTERIUM XEROSIS (KUSCHBERT).

(Synonymy: *Bacillus xerosis* Kuschbert and Neisser.)

Differential Characteristics. — A diphtheroid with morphology resembling *Coryn. diphtheriæ*, with large irregular polar granules, producing a dry, adherent growth on the media. Its colonies even on enriched media are slow growing and never attain size of *Coryn. diphtheriæ* colonies. It ferments dextrose, saccharose and maltose characteristically. It leaves dextrin unchanged. It is avirulent. It differs from *Coryn. diphtheriæ* in its more delicate growth in fermenting saccharose and failing to ferment dextrin and in its avirulence and lack of a soluble toxin.

Morphology. — Non-motile, diphtheriæ-like morphology. Morphology like *Bacillus flavus* rather than *Bacillus hoagii*. Average length to long bacillus, slightly curved, clubbed and segmented. Large polar bodies, especially on subcultures.

Staining. — Gram positive.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at 37° C. Poorly at 20° C. No growth on extract media.

Agar Colonies. — Minute, raised, round, smooth, almost transparent (forty-eight hours).

Alka Potato Agar Colonies. — Small, round, smooth, dome-shaped, gray, resembling those of *diphtheriæ bacillus*.

Glucose Agar Colonies. — Dry, transparent or whitish, slow growing, colonies scanty.

Gelatine Stab. — Many cultures fail to grow.

Agar Slant. — Dry, transparent film, giving slant a ground glass appearance. Appearance not changed by prolonged incubation.

Litmus Milk. — Unchanged.

Potato. — No visible growth.

Loeffler's Medium. — Very minute on primary cultivation. Resembles

Bacillus diphtheriæ except for size and tends to adhere to the medium and become irregular at the edges after seventy-two hours.

Broth. — Often a pellicle clear. Growth more delicate than *Coryn. diphtheriæ*.

Action on Carbohydrates. — Dextrose, saccharose, maltose are fermented. Dextrin is not fermented. Exceptionally maltose or saccharose may not be fermented. Levulose, galactose are also fermented. Lactose, dulcitol, mannitol are not fermented.

Pathogenesis. — Described by one observer as pathogenic for guinea pigs. Considered non-pathogenic usually.

Source. — Secretions of eyes of human individuals and animals. From cases of conjunctivitis called xerosis.

Reference. — Kuschbert and Neisser, *Deut. Med. Woch.*, 24, 1884.

CORYNEBACTERIUM MACULATUS (GRAHAM-SMITH).

(Synonymy: *Bacillus maculatus* Graham-Smith.)

Differential Characteristics. — A diphtheroid larger and broader than *Coryn. diphtheriæ*, producing large opaque colonies on Loeffler's medium. Growth on media not dry and adherent like *Coryn. xerosis*. It ferments dextrose. Other fermentative reactions unknown. Tentatively placed in *Coryn. xerosis* group.

Morphology. — Non-motile. Longer and broader than the diphtheria bacillus. Many darkly stained segments cross the bacillus. In a few there are oval segments. Numerous polar bodies; many of them are large and round, some are minute.

Staining. — Gram positive.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at 37° C. Very poorly at room temperature on gelatine.

Gelatine Colonies. — Scarcely visible even at end of ten days with a lens.

Agar Colonies. — Minute, round, transparent, slow-growing colonies (twenty-four hours). Polar bodies few.

Alka Potato Agar Colonies. — Round, rather flat, slightly granular colonies with irregular margins.

Gelatine Stab. — Very slow growth. Growth in the depth of the stab does occur.

Litmus Milk. — Unchanged.

Potato. — No visible growth.

Loeffler's Medium. — In twenty-four hours, opaque, white, but in other respects similar to those of the diphtheria bacillus.

Broth. — Remains clear with few discrete yellowish granules.

Action on Carbohydrates. — Dextrose slightly acid.

Products. — Indol negative.

Pathogenesis. — Non-pathogenic for guinea pigs.

Source. — Throat culture.

Reference. — Graham-Smith, *Jour. Hygiene*, 4, 1904, 304.

CORYNEBACTERIUM HOAGII (MORSE).

(Synonymy: *Bacillus hoagii* Morse.)

Differential Characteristics. — A diphtheroid of average size (slightly smaller than *Coryn. diphtheriæ*) producing solid, barred, wedge and involution forms and showing small imperfect granules. It produces an abundant, pale salmon-pink growth on Loeffler's and potato. It clouds broth with or without the formation of a pellicle, and ferments dextrose and saccharose always. Less often it ferments maltose, inulin, dextrin and salicin. Lactose, mannite and glycerine are usually not fermented. It is but mildly pathogenic for guinea pigs.

Morphology. — Non-motile. Average size (smaller than *Bacillus diphtheriæ*); solid, barred and wedge forms with abundant but small and imperfect granules. May be coccoid or conical like *Bacillus hoffmanni*. Involution forms present, but smaller than those of *Bacillus diphtheriæ*.

Staining. — Gram positive. Sometimes faintly so.

Conditions of Growth. — Facultatively anaerobic. Grows at both 20° and 37° C., better at 37° C.

Gelatine Stab. — No liquefaction. Puncture growth beaded. Surface growth dry, yellow, elevated.

Agar Slant. — Abundant, moist, coalescing growth. Slow growth at 20° C.

Loeffler's Serum. — More moist, creamy and rapid in growth than *Bacillus diphtheriæ*. Decided pale salmon-pink tint, often buff-colored when old.

Potato. — Faint salmon-pink or buff.

Broth. — Very turbid, with or without pellicle. Usually a marginal ring growth. Dextrose and saccharose always fermented without gas production. Less constantly maltose is fermented. Dextrin, inulin and salicin are irregularly fermented.

Action on Carbohydrates. — Lactose, raffinose, mannite, glycerine often or usually negative.

Pathogenesis. — Local subcutaneous abscesses in guinea pigs. At times found as a secondary invader.

Source. — Respiratory tract of normal and general paralytic individuals.

Reference. — Hoag, Boston Med. and Surg. Jour., 157, 1907, 10.

CORYNEBACTERIUM PARALYTICANS (FORD-ROBERTSON).

(Synonymy: *Bacillus paralyticans* Ford-Robertson.)

Differential Characteristics. — Identical with *Coryn. hoagii*; said to be the saprophytic form of it. The growth on serum is apt to be yellow-white rather than salmon-pink. It ferments dextrose, maltose and saccharose.

Morphology. — Non-motile. Large, barred bacillus, often with tapering ends. Numerous well-formed granules. Thicker and slightly more curved than *Bacillus diphtheriæ*. Arrangement parallel. No K. L. involution forms; fuse in poorly staining masses.

Staining. — Gram positive.

Gelatine Stab. — No liquefaction.

Serum Colonies. — In twenty-four hours, discrete, moist, yellow-white colonies. Growth abundant on this medium. Largest colonies attain a size of 1 mm.

Action on Carbohydrates. — Dextrose, maltose, saccharose rendered acid. Glycerine, dextrin not fermented.

Pathogenesis. — Avirulent.

Source. — Supposed to have had etiologic relation with paresis.

Reference. — Ford-Robertson and McRae, *Rev. of Neurol. and Psych.*, 1, 1903, 225.

CORYNEBACTERIUM AURIS (GRAHAM-SMITH).

(Synonymy: *Bacillus auris*. Graham-Smith.)

Differential Characteristics. — Differs from *Coryn. hoagii* in its much slower and more sticky or tenacious growth. It also lacks the characteristic pigment. It is non-pathogenic. It forms indol.

Morphology. — Non-motile. Medium length or over. Slightly curved and some are clubbed. Several well-marked polar bodies by Neisser's stain.

Staining. — Gram positive.

Gelatine Colonies. — Small, almost transparent, round (forty-eight hours); larger and whiter with a smooth surface in three to four days. Growth is sticky and tenacious.

Agar Colonies. — Small, round, gray, convex.

Alka Potato Agar. — Smooth, gray, round, convex; later large and white.

Gelatine Stab. — Irregular, granular, white surface growth; good puncture growth.

Litmus Milk. — Unchanged.

Potato. — Slight brown-yellow growth, becoming spreading, soft, yellow and glistening in forty-eight hours.

Loeffler's Medium. — Resembles those of the diphtheria bacillus closely, but growth occurs more slowly.

Broth. — Slightly turbid; white, stringy sediment.

Action on Carbohydrates. — Dextrose very acid.

Products. — Indol positive.

Pathogenesis. — Non-pathogenic.

Source. — Ear discharges of scarlet fever patients.

Reference. — Graham-Smith, *Jour. Hygiene*, 4, 1904, 311.

CORYNEBACTERIUM RUEDIGERI (MELLON).

(Synonymy: *Bacillus ruedigeri* Mellon.)

Differential Characteristics. — A diphtheriod with morphology resembling the diphtheria bacillus, producing a heavy growth on simple media, showing a characteristic reduction of litmus, failing to ferment any of the sugars, and producing a soluble toxin not neutralized by diphtheria antitoxin.

Morphology. — Non-motile. Morphology like *Bacillus diphtheriæ*.

Staining. — Gram positive.

Gelatine Stab. — Abundant.

Agar Slant. — Heavy, soft, moist, white growth.

Litmus Milk. — Reduced in five to six days.

Potato. — Hardy, light brown growth.

Loeffler's Medium. — Abundant growth.

Broth. — Diffusely cloudy; alkaline.

Action on Carbohydrates. — None fermented.

Pathogenesis. — Soluble toxin; very pathogenic for guinea pigs. Not protected by diphtheria antitoxin.

Source. — Fatal cases of scarlet fever with gangrenous tonsillitis.

Reference. — Ruediger, Trans. Chicago Path. Soc., 6, 1903, 45.

CORYNEBACTERIUM CERUMINIS (GRAHAM-SMITH).

(Synonymy: *Bacillus ceruminis* Graham-Smith.)

Differential Characteristics. — A long, slender, slightly curved diphtheroid with polar bodies. Abundant with white or yellow-white growth, occurs on the simple media. It produces no growth in gelatine stab, leaves litmus milk unchanged, and does not ferment the sugars. Broth remains clear with a white, stringy sediment; a yellow-white abundant growth occurs on potato. It is non-pathogenic.

Morphology. — Non-motile. Two types. One is long, slender, slightly curved forms, with small polar bodies; other is of average length, slightly curved, with large polar bodies.

Staining. — Gram positive.

Loeffler's Serum Colonies. — Growth scarcely visible in twenty-four hours. Small, round, indistinguishable from those of diphtheria bacillus in forty-eight hours.

Agar Colonies. — Small, round, gray, convex, later large and white.

Alka Potato Agar Colonies. — Average sized, white, opaque, convex (twenty-four hours).

Gelatine Stab. — No growth.

Litmus Milk. — Unchanged.

Potato. — White or yellow, white later abundant.

Broth. — Clear; white, stringy sediment.

Action on Carbohydrates. — Dextrose neutral or alkaline.

Products. — Indol negative.

Pathogenesis. — Non-pathogenic.

Source. — Normal and scarlet fever ears.

Reference. — Graham-Smith, Jour. Hygiene, 4, 1904, 311.

CORYNEBACTERIUM TRICHODIPHTHEROIDE (MILLER).

Differential Characteristics. — Irregular, thread-like or bipolar rod-like, Gram variable diphtheroid, with Gram positive bodies forming clubbed and curved forms. Its colonies are discrete, small, non-confluent. It produces no change in purple milk, leaves broth clear with a slight sediment, and fails to ferment the sugars. It is non-pathogenic for rabbits.

Morphology. — Non-motile, irregular thread-like forms on primary isolation. Gram variable, but often with Gram positive bodies within them. Later bacillary forms, with bipolar Gram positive bodies. Clubbed or curved forms occur as involution forms.

Staining. — Polar bodies Gram positive. Rest of bacillus often Gram negative.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows well on agar, gelatine as well as serum. Grows at both 20° and 37° C.

Loeffler's Serum Colonies. — Small, discrete colonies, never becoming confluent.

Gelatine Stab. — No liquefaction. Small, discrete, yellow-white colonies along the puncture.

Agar Slant. — Growth of discrete colonies.

Purple Milk. — Unchanged.

Broth. — Clear. Very slight sediment.

Action on Carbohydrates. — Dextrose, mannite, saccharose not fermented in ten days.

Pathogenesis. — Non-pathogenic for rabbits or caviae.

Source. — Case of meningitis in infant.

Reference. — Miller and Lyon, Amer. Jour. Med. Sci., 162, 1921, 593.

CORYNEBACTERIUM HOFFMANNI (LOEFFLER-HOFFMANN-WELLENHOFF).

(Synonymy: *Bacillus hoffmanni* Hoffmann-Wellenhoff.)

Differential Characteristics. — A short, oval diphtheroid usually with a central unstained septum, at times barred or wedge-shaped. Neisser granules are absent or extremely atypical. The growth is abundant; yellow-white in color. Sugars are not fermented. Non-pathogenic. It differs from *Coryn. diphtheriae* in absence of polar bodies and in its tendency to stain solidly. It is shorter and thicker and does not curve as gracefully as *Coryn. diphtheriae*. Growth is more luxuriant and may

be chromogenic. Sugars are not fermented. The soluble toxin and pathogenicity of *Coryn. diphtheriæ* are absent.

Morphology. — Non-motile, thick, small, straight rods, often barred or wedge-shaped. No granules. An oval bacillus with one unstained septum. Arranges itself in parallel groups resembling a paling.

Staining. — Gram positive. Neisser's stain, blue granules will be absent or very indistinct or atypical from those of the diphtheria bacillus.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at both 20° and 37° C. Develops on extract media even on primary isolation. Growth more luxuriant than *Coryn. diphtheriæ*.

Loeffler's Serum Colonies. — Indistinguishable from diphtheria bacillus.

Agar Colonies. — Larger, less transparent and whiter than those of the diphtheria bacillus.

Gelatine Stab. — No liquefaction. Growth present.

Potato. — Smooth, abundant, white-yellow growth.

Loeffler's Medium. — Scanty or heavy, white or yellow-white in color.

Broth. — More apt to produce a turbidity and less apt to produce a pellicle than the diphtheria bacillus.

Action on Carbohydrates. — Sugars not fermented.

Products. — Indol none or slight.

Pathogenesis. — Rarely found to be pathogenic.

Source. — Throats of healthy individuals, etc.

References. — Hoffmann-Wellenhoff, *Wien. med. Woch.*, 3, 1885. Loeffler, *Centr. f. Bakt.*, 2, 1887.

CORYNEBACTERIUM MENINGITIDIS.

Differential Characteristics. — A short diphtheroid often in pairs with absent polar bodies. The growth is very scanty and delicate gray-white in color. Sugars are not fermented, with the exception of dextrose. Non-pathogenic for guinea pigs except when large intravenous doses are used.

Morphology. — Non-motile, short, often in pairs; in exudates often within the leucocytes. Polar bodies are absent.

Staining. — Gram positive.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at both 37° and 20° C.

Goat Blood Agar. — Delicate, grayish film or isolated, slightly convex, gray colonies less than a millimeter in diameter. Blood remains unchanged. Growth more luxuriant on this medium than on plain agar or Loeffler's serum.

Gelatine Stab. — No liquefaction.

Litmus Milk. — Unchanged.

Broth. — Clear. Finely granular sediment.

Action on Carbohydrates. — Dextrose acid, no gas. Maltose, saccharose, lactose, mannite, galactose, inulin, dextrin, salicin, dulcitol, raffinose not fermented.

Pathogenesis. — Pathogenic for guinea pigs by intravenous injection, but not by subcutaneous or intraperitoneal inoculation.

Source. — Case of cerebrospinal meningitis from blood and spinal puncture fluid.

Reference. — Dick, Jour. Amer. Med. Assoc., 14, 1920, 84.

CORYNEBACTERIUM ENZYMICUS (MELLON).

(Synonymy: *Bacillus enzymicus* Mellon.)

Differential Characteristics. — A highly pleomorphic diphtheroid, producing both coccoid and bacillary forms; possessing a capsule in the animal body. It produces good growth but no liquefaction in the gelatine stab, acid and clotting in litmus milk, no growth on potato, and ferments a wide range of the sugars. It is pathogenic for rabbits.

Morphology. — Non-motile. Very pleomorphic chains with cocci and bacillary forms present. Two chromatic bars (wedge-shaped) at either end. Tends to revert to coccus form. No spores. Capsules in animals.

Staining. — Gram positive.

Conditions of Growth. — Facultative anaerobe. Sugar and ascitic fluid enhances growth. Grows at both 20° and 37° C.

Gelatine Stab. — No liquefaction. Good growth.

Blood Agar Slant. — Bacillary, twenty-four to forty-eight hours. Very fine, transparent, becoming translucent or gray.

Litmus Milk. — Acid and clot; forty-eight to seventy-two hours. No gas.

Potato. — No growth.

Blood Agar. — Luxuriant, coalescent, moist growth, indicates cocci and coccoids. (Easy type to obtain.) Discrete, translucent or transparent growth-bacillary forms. (To change use partly desiccated blood agar or add acid.)

Plain Broth. — Very scanty growth.

Dextrose Broth. — Sparse, granular growth, settling and clinging to walls.

Action on Carbohydrates. — Wide range. Dextrose, lactose, dextrin, maltose fermented. With few exceptions saccharose, glycerine, mannite, anulin and salicin are fermented.

Products. — Indol negative. Only trace of nitrites.

Pathogenesis. — Somewhat pathogenic for rabbits, causing suppurative arthritis, cholecystitis and myositis.

Reference. — Mellon, Jour. Bact., 3, 1918, 81.

CORYNEBACTERIUM CORYZÆ SEGMENTOSUS (CAUTLEY).

(Synonymy: *Bacillus coryzæ segmentosus* Cautley.)

Differential Characteristics. — A diphtheroid of average size, at times showing small, bipolar granules, often of *Coryn. hoffmanni* morphology with a light median septum. It forms a good non-chromogenic growth on

the simple media, and ferments dextrose, lactose, saccharose and maltose. Broth remains clear with a stringy, white sediment; potato shows an almost invisible whitish film. It is non-pathogenic.

Morphology. — Non-motile. Most specimens show the organisms with small polar bodies. At end of twenty-four hours characteristic morphology is that of Hoffmann bacillus, with a light median band but is longer.

Staining. — Gram positive.

Gelatine Colonies. — Small, round, white colonies at 22° C.

Agar Colonies. — Round, smooth, white, raised, dome-shaped colonies in forty-eight hours.

Gelatine Stab. — No liquefaction.

Litmus Milk. — Acid without clot formation.

Potato. — Almost invisible whitish film. Potato (alka) agar: small round, smooth, gray, dome-shaped colonies which in forty-eight hours become large, smooth, white and much raised.

Broth. — Remains clear, stringy, white sediment.

Action on Carbohydrates. — Ferments dextrose, galactose, lactose, levulose, saccharose and maltose.

Pathogenesis. — Non-pathogenic.

Source. — Throat culture of a diphtheria "contact."

Reference. — Cautley, Rep. of M. O. H. to Loc. Gov. Board, 5, 1894.

Note. — *Bacillus septus* Benham, 1906, is identical with it except for absence of bipolar bodies.

CORYNEBACTERIUM HODGKINI (BUNTING).

Differential Characteristics. — A long, very pleomorphic diphtheroid, showing polar bodies. The extreme pleomorphism of *Coryn. enzymicus* is lacking. It does not clot milk except on boiling. Growth is slight on potato and gelatine. It ferments all of the more common sugars and is avirulent.

Morphology. — Non-motile, very pleomorphic. Long, granular banded or clubbed forms. Polar staining especially on serum media. Branching observed. Often coccoid, especially in old cultures. Bacillary forms in early cultures.

Staining. — Gram positive. Non-acid fast.

Conditions of Growth. — Grows well on plain media. Growth slower on dry media. Aerobic and facultatively anaerobic. Grows luxuriantly at 37° C.

Plate Colonies. — Round, with regular edge, glistening, gray becoming opaque, white. Under low power a dark central nucleus.

Gelatine Stab. — No liquefaction. Very slight growth.

Agar Slant. — Glistening, gray, becoming opaque and white. At times slightly greenish yellow.

Litmus Milk. — No change. Clots on boiling.

Potato. — No growth usually.

Loeffler's Medium. — Luxuriant growth, usually of discrete colonies.

Broth. — Remains clear; flecks on sides of tubes. Slimy sediment.

Action on Carbohydrates. — Dextrose, maltose, saccharose, lactose, glycerine, mannite, dextrin and occasionally others are fermented.

Products. — Indol negative. Nitrites reduced.

Pathogenesis. — Avirulent. In monkeys, claim has been made of the reproduction of the disease.

Source. — Lymph glands from cases of Hodgkin's disease.

Reference. — Bunting and Yates, Arch. Int. Med., 12, 1913, 236.

CORYNEBACTERIUM MOBILIS.

Differential Characteristics. — A motile, Gram variable, liquefying, short, regular diphtheroid, with a few polar bodies, producing an abundant slightly yellowish growth on the plain media. It produces a rapid, infundibuliform liquefaction in the gelatine stab, a turbidity and gray-white granular sediment in broth, an abundant, moist, spreading growth on potato and ferments none of the sugars though it is said to produce gas from dextrose broth. It produces much indol; does not reduce nitrates and is only mildly pathogenic.

Morphology. — Motile. Slightly shorter in length than the diphtheria bacillus and of more regular form. Some always show polar bodies in a smear, but most are either unipolar or stain uniformly.

Staining. — Variable.

Conditions of Growth. — Grows at both 20° and 37° C. Grow readily on the plain media. Sweetish, acetone-like odor is very characteristic.

Gelatine Stab. — Rapid infundibuliform liquefaction. In forty-eight hours liquefaction is complete.

Agar Slant. — Slightly yellow, moist, spreading growth, with a tendency to soften the agar.

Litmus Milk. — Slow acid formation. Clotted in seventy-two hours.

Potato. — Moist, raised, abundant, spreading, colorless.

Loeffler's Medium. — Moist, soft, slimy, abundant, spreading, at first colorless, later pale yellow. In a few days the serum is completely liquefied.

Blood Agar. — Small zone of hemolysis about a raised, slightly yellow, moist colony.

Broth. — Turbid; granular, gray-white sediment.

Action on Carbohydrates. — Glucose gas present, but reaction is alkaline. Lactose, maltose, saccharose alkaline without gas formation.

Products. — Indol positive (much). Nitrites not reduced.

Pathogenesis. — Local abscess, with very slight general symptoms when injected subcutaneously (guinea pig).

Source. — Local and generalized infection of tonsils.

Reference. — DeWitt, Jour. Inf. Dis., 10, 1912, 36.

CORYNEBACTERIUM CHROMOGENS.

Differential Characteristics. — A slender liquefying diphtheroid, showing barred or solid types but never Neisser's granules. It produces an abundant growth on the plain media. It produces a gray-green growth on the agar slant, discoloring the medium dark brown or purple, a turbidity in broth and a gray-red-brown abundant growth on potato. Its pathogenicity is negative or slight.

Morphology. — Negative. Slender, barred or solid types, often short in length. Neisser granules absent.

Staining. — Gram positive.

Gelatine Stab. — Liquefaction present.

Glycerine Slant. — Abundant, gray, turning agar dark brown or purple.

Potato. — Gray-red-brown, abundant; at times dry.

Loeffler's Medium. — Moist, often abundant, colorless. Liquefaction commonly present.

Broth. — Turbid, becoming acid in reaction.

Action on Carbohydrates. — No gas formation.

Pathogenesis. — Negative or slight.

Source. — Cases of scarlet fever and diphtheria.

Reference. — Hamilton, Jour. Inf. Dis., 1904, 698.

CORYNEBACTERIUM DIPHTHEROIDES-LIQUEFACIENS (GRAHAM-SMITH).

(Synonymy: *Bacillus diphtheroides-liquefaciens* Graham-Smith.)

Differential Characteristics. — A long, curved, liquefying diphtheroid, showing well-marked polar bodies, but no segmentation or involution forms; at times motile. The growth on plain media is abundant. Its colony is of average size, round, slightly yellowish and convex. It produces a slow crateriform or infundibuliform liquefaction in the gelatine stab; reduces litmus milk and often clots it; it forms a finely granular sediment in broth with a slight turbidity, an abundant growth on potato, and ferments dextrose and sometimes lactose. Much indol is formed and nitrates are reduced.

Morphology. — May be motile. Very long and curved. Segmentation absent. Lie in groups parallel to one another. No involution forms. Well-marked polar bodies stained by Neisser's method.

Staining. — Gram positive.

Conditions of Growth. — Aerobic and facultatively anaerobic. Grows at both 20° and 37° C.

Gelatine Colonies. — Very minute, transparent colonies form. Liquefaction occurs around the tenth day.

Gelatine Stab. — Gelatine liquefied slowly. Small yellowish surface growth lying in crater of liquefaction (three days). At end of eleven days funnel-shaped liquefaction has occurred with yellowish sediment at bottom.

Agar Slant. — Thick, moist, smooth, slightly yellow, abundant.

Litmus Milk. — Usually clotted. Reduced.

Potato. — Slow but abundant growth. At first white, becoming yellow in six days.

Loeffler's Medium. — Minute, rounded colonies form in twenty-four hours; at end of two days they are medium-sized, round, slightly yellow, dome-shaped and opaque. At end of ten days small pits have formed. Medium is partly fluid when kept twenty to thirty days at room temperature.

Broth. — Slightly cloudy (forty-eight hours). Heavy, finely granulated sediment.

Action on Carbohydrates. — Dextrose, sometimes lactose, fermented.

Products. — Indol positive (much). Nitrates reduced. No gas formation.

Pathogenesis. — Non-pathogenic.

Source. — Mouth of diphtheria patient.

Reference. — Graham-Smith, Jour. Hygiene, 4, 1904, 258.

From the above, it will be observed that the diphtheroid group can satisfactorily be divided into nine groups. The primary division is made on the basis of the liquefaction of gelatine, the liquefiers being very different in character from the non-liquefying types. The non-liquefying groups are best separated according to the fermentation of the two sugars, — dextrose and saccharose.

The true diphtheria group and the flavidus groups are obtained as dextrose positive and saccharose negative groups. The xerosis and hoagii groups ferment both dextrose and saccharose, while the ruedigeri, ceruminis and hoffmanni groups ferment neither (occasionally only dextrose). The enzymicus group is distinguished by its extremely wide fermentative range. The ceruminis group is recognized as a group distinct from the hoffmanni group because the latter group is characterized by the absence of polar bodies, while the ceruminis group show these in at least fair abundance. The individual species of these groups, if these may be called such, are differentiated on the basis of cultural characteristics on solid and fluid media.

CONCLUSIONS.

Work of the above type accomplishes the following: —

1. It gives a complete synonymy of each organism.
2. Elimination of organisms incompletely described and impossible of identification.
3. Renaming of organisms to conform with the nomenclature

advised by the Society of American Bacteriologists, thereby establishing uniformity and ridding the field of worthless bacteriological names which have encumbered literature in the past.

4. Differential charts enabling one at a glance to contrast an organism with those most apt to be confused with it, either pathogenic or non-pathogenic.

5. Schematic index to the bacteria, enabling one to identify an unknown organism by the most direct route consistent with accuracy.

6. This plan, when extended to cover all the common bacteria, will supply a long-felt need in the field of determinative bacteriology.

THE NECESSITY OF MAINTAINING PROPER STANDARDS OF NURSING CARE.*

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Civilization connotes change and progress. Advance in civilization can always be measured or determined by the character of the concepts of the individual regarding his relations to others as well as to himself. Whether these relations and interrelations are particularly concerned with matters of a physical, moral, economic or spiritual nature, they all will reduce themselves in the end to a fundamental basis, namely, the individual's attitude or relation to his physical *me*, his social *me*, and his spiritual *me*.

The history of civilization, unfortunately, does not show that advances have always been constant or that progress has always been made along the best and most definite lines. Although convinced that civilization is evolutionary we are forced to admit that in its course are found periods of stasis and even regressions, and that many of the concomitant changes are as liable to be caused or accompanied by violence as by orderly measures based upon reason and the experience of others. The greatest advance has been in the realm of social relationships, and we actually progress in civilization as we develop broad social instincts. The period comprising the last century, characterized by great advances in the arts and sciences, has also been characterized by the practical application of the obligations and duties of the individual to his fellow man, not only as it relates to personal contact, but to the community at large, and to the whole human race. The late World War, despite its interpretation by many as being an evidence of a set back for civilization, has been productive of placing before us, as never before, the importance of our social interrelationships and particularly the necessity for assistance to others, and the fact that to aid one another is both an individual and a national duty. Of the many things learned as a result of the war, none has been of more importance than the appreciation that a nation and a people can

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be successful and can develop only as their minds and bodies are taken care of and protected, and it has been demonstrated especially that the prevention of disease and the carrying out of the general precepts of health are the great factors in the program for development.

The history of nursing goes back to the beginning of the history of civilization, and in a way we find the course of nursing more or less conforming to the general changes and fluctuating course that has marked civilization. The benefits of intelligent care, particularly for the physically ill, have always been appreciated, to some extent, by all peoples, but there has never been anything further than a relative comprehension of the scope of the field of nursing or of its actual benefits. Previous to the last century, efforts at organized nursing were carried on usually by independent and unrelated bodies and societies, or by religious orders representing the various churches, and in Christian countries it is to the credit of the churches that the spirit of nursing was kept alive through periods of varying degrees of darkness. It can rather be concluded, at least in some instances, that the motive of those entering upon this work was largely based upon the idea of a spiritual reward, but it cannot be charged that service to the individual and to the community was disregarded. The changes naturally resulting from the new spirit introduced by Florence Nightingale, although constituting a marked advance, only partially presented the importance of nursing from its broad aspect, and only defined to a limited extent what we now believe to be the true ideal of the nursing profession.

In the last half century there has been marked progress. Training schools have been introduced into practically all hospitals, and the courses have not only become lengthened, but have been made more practical. This progress, although on the whole sure and steady, showed the marks of the influence here and there of the public's sentimental attitude toward the care of the sick in general and especially as it related to hospitals. Some who became applicants for the training schools made the decision because they felt they had certain powers "to cool the fevered brow" and to heal the sick, and as a result would be regarded in the light of the ministering angel, while others entered gaily into this work of hardship feeling it was the fashionable thing to do. As time went on, naturally, this particular element of sentimentality to a considerable extent disappeared and was

replaced by the more practical reason for entering a training school, namely, that it provided a splendid vocation for certain types of young women. The demands for more scientific and better training resulted in another change, and nursing gradually came to be looked upon less as a vocation and more as a profession, and so conforming with the general trend of the times I believe we can see the growth of nursing from a vocation, requiring a certain amount of education and proficiency in the care of the sick, to a profession, the requirements of which demand a good preparatory education and the acquiring of considerable scientific knowledge. On the whole, its development has been along lines of intelligent progress. Associations have been formed and much literature has been contributed by nurses to the various magazines or organs managed by their national and State associations. The whole result has been one great achievement, and at the present time nursing presents itself as one of the important, if not the most important, of all professions. When we take into consideration the handicaps, the character of the work, the long hours, the amount of study, the rigid training, the privations, small remunerations and the service given, our respect for the nurse and for the nursing profession should be greatly increased. As time went on and the courses for the training schools were lengthened and the preliminary educational requirements were raised, it became more and more difficult to become a graduate nurse. The late World War has presented to us the importance of nursing as it has never been understood or appreciated before. The part that the nurses played, both abroad and in this country, cannot only not be given too great praise and too much appreciation, but has placed the profession in a position that not only demands respect but has caused it to be considered a great and necessary factor for the proper defence and life of the Nation.

As the community came to realize the value of the nurses' work, so have the demands for the nurse increased. No longer do we conceive the function of the nurse to be restricted to the care of patients in the hospitals and in the private homes. New fields for operation of the nurses' function have already been recognized, and the future promises more new fields to be opened and a general enlargement of the nurses' sphere. The public health nurse, the district nurse, the factory nurse, the school nurse, the Red Cross nurse, the army nurse, and the nurse specialized in other fields are not only at present in great de-

mand, but have been so for some years, and the demands along these lines are increasing every year. The future can only be predicated on a basis of experience and present trends. I believe it can be rightly assumed that the call and need for nurses will not only be for greater work along these particular lines, but will come from unthought of sources and angles. The field of prophylaxis, or the prevention of disease, is only beginning to be opened up, and the time seems to be ripe for great development. Undoubtedly, for a comparatively long period of time the development of this branch of medicine will demand the employment and co-operation of specialized nursing. In the war for the prevention of disease in general and especially against the invasions of epidemics, the nurse will have to play the part of the day and night outpost as well as the real front and rear line defender.

The education of the Nation is about to undergo radical changes. So far it has rather been limited to the teaching of languages and the fundamentals of the arts and sciences, overlooking that large territory in which lies the health, both mental and physical, of the child, the youth and the adult. I believe that the hope for future generations and the Nation's best welfare depend upon the conception of the aims and methods of education as they will apply to the practical training of the child, the youth and the adult from standpoints of physical, mental and moral health. If this new development in the field of education should take place, and I have no doubt of it, it can only be successfully accomplished with the aid of the scientist, the physician and the nurse, the latter probably playing the greatest and most important rôle. All of this will, of course, by increasing the demands, require not only more highly trained and more highly specialized nurses, but will require a much greater number. As the preliminary requirements have been increased, as the standards of the training course have been raised, as the new fields have opened and in general the demands have increased, the inevitable has occurred, that is, that even at the present time the demand has become greater than the supply. To be sure, the war, special economic conditions, lessened immigration, and other factors have all assisted in decreasing the supply. The situation at the present time is both acute and grave, and the future holds out little hope unless steps are taken to somehow remedy this condition.

It would seem that we are about to enter upon a new epoch

in the history of nursing and that now is the opportune time to take stock, to develop new ideas, to formulate new plans and arrange for new programs not only to meet the requirements of the present, but to provide for the necessities of the future. How is the nursing profession and all others who are interested in and appreciate this condition going to meet the situation? How are we to meet these new requirements and at the same time increase the numbers? The field of usefulness of this work is not and cannot be restricted to the part to be played by the specialized and scientific nurse. Usual nursing care of high grade character must still be rendered to the patient in the hospital, to the patient in the private home, and especially in the homes of that class of citizens who do not care to accept charity but whose resources will not permit the employment of a scientific, highly specialized nurse. Current literature in nursing magazines indicates that the nursing profession is alive to this situation and is attempting to work out a solution. So far as can be learned, with one or two exceptions, the plans that have been suggested in several States are about as follows: to increase the requirements and standards for the graduate nurse and to supplement the deficiency in numbers that will inevitably occur, as did occur under like conditions in the medical profession, by the introduction of a new element into the nursing field, namely, the trained and licensed attendant. The bills that have been introduced into the Legislatures of two States, at least supported by some of the leaders of the nursing associations, as well as by interested parties of laymen and laywomen, provide for the licensed attendants to receive a nine months' training in a hospital, sanatorium or association. The proponents of the various bills for licensing attendants state that the licensed attendant can take care of the ordinary sick person in the home and will also be able to do a certain part of the nursing work in the hospitals. On the surface, this would seem to be a practical solution of this question, but examination into it by some leads to the conviction that the very object sought will not be attained, and that it may be the means of the introduction of an inferior element into the nursing field with results correspondingly disastrous.

In the first place, the requirements as set forth for the licensed attendant do not include any preliminary education and a rather indefinite and vague training of nine months, and yet they are expected to take over a considerable portion of nursing work

which up to this time it was felt could be done only by those who had taken at least two or more years of good hospital training. If this were to be considered in the light of an emergency or an expediency it could perhaps be excused, but with the trend and the necessity for raising the standards of the trained nurse, the inevitable lessening in the number of graduates and applicants for the training schools, will not the amount of this nursing work to be turned over to the licensed attendant increase and become more complicated?

Secondly, have we a right to conclude or even assume that there will be a rush of applicants to the hospitals, sanatoria and associations for the degree of licensed attendant? What stimulus will there be even for the poorly prepared female to attain a degree of such an inferior rank and under a new name to do the work hitherto done by the nurse? My own opinion is that recruits in any great numbers cannot be expected for the degree of licensed attendants, and this opinion is based upon the experience had in the State hospitals in Massachusetts. In 1916 the nursing care for the insane in the State hospitals in Massachusetts was standardized. This standardization arranged for a definite preliminary educational requirement of one year in high school and a three years' course for the training school for nurses. It was expected that this would reduce the number taking the training course for nurses, and to supplement for this reduction a course for trained attendants was also introduced. Our expectations as to the reduction of numbers were realized and in some instances the reductions were considerable. While the standardization was successful from the standpoint of the training school for nurses, outside the question of numbers, the training course for attendants was not the success we had hoped. Not only were young women not eager to take the attendant course but in some cases had to be urged to take it. The word trained attendant appeared to be objectionable, and, as some have expressed to me privately, they saw no reason why, if they were doing a part of the nurses' work, they should not be called nurses. What evidence has been presented to indicate, outside of a few isolated instances, that young or adult women desire to take a course for trained attendants and to be known as licensed attendants?

Thirdly, is it possible that we can so easily change the connotation of the term nurse? Taking care of the sick, whether by one specially trained and registered or not, is undoubtedly looked upon by people in all walks of life as nursing, and I am

convinced that no act of the Legislature or any other thing will change the people's ideas as to how this work should be termed and classified. In a word, is not the work that is supposed to be done by these licensed attendants a very important part of nursing work and why, therefore, should it not be carried on by nurses? In the medical profession, the general practitioner in many instances is not looked upon as a scientific man, and, as a rule, is certainly not doing specialized work, yet his work is not regarded as unimportant and he is still known as doctor. I have been told that a meeting of any nursing association in which reference is not made to "Sairey Gamp" and her style of nursing is rare, but would not this innovation push "Sairey Gamp's" work into such a state of oblivion that her name would not even be remembered within a decade or so?

In finally determining the course to pursue, to solve this problem, I believe the one factor for guiding us should be service. This matter is of such a nature and is of such importance that a consideration of it should not be confined to the nursing profession only. Successful medical progress can only be attained when accompanied by adequate nursing progress, and so it is rightfully as important a matter to the physician as it is to the nurse. The community, which will either suffer or be aided by the determination of this question, should also be interested and where possible consulted. I believe that the solution to be arrived at must be primarily based on the premise that caring for the sick in any capacity is nursing, and that the introduction of a new name will not only be illogical but, through its results, detrimental.

In place of resorting to the licensed attendant as a means for meeting this condition, there has been suggested a plan that would establish a graded system of nurses. Briefly, this would arrange for at least two and possibly three grades of nurses. If we should accept the plan of the three-graded system, the highest grade, termed whatever it may, would be attained by those who have had at least a high school education, or possibly one or two years in college as a preliminary requirement, and who would be graduates of hospitals of high rank, giving them at least a three or four year course of training. From this grade could be obtained the scientific, the specialized nurse, and the superintendents of nurses for training schools of all ranks. The second grade would comprise that group of nurses who have been graduated from a grammar school, or better, have had one year in high

school, as a preliminary educational requirement, and whose hospital training would be at least two years and possibly more. This grade of nurse would be the one that would be called upon particularly to do the usual nursing in the community in private families, and in general to do the work that has been done by the trained nurse up to within a few years. The third grade would simply be the practical nurse with at least one year's hospital training, and whose work would lie along the lines of the present untrained household nurse of the community.

The alternative plan for this, namely, to have nurses divided into two grades, could be briefly stated as follows: the first grade to consist of those who have taken at least a three or more years' course in a hospital of recognized standing, and whose preliminary requirements should be a high school course or college work, and in general correspond to the requirements and training as set forth in the highest grade of the first suggested plan. The second grade would consist of those who will have had at least a grammar school education and at least eighteen months or more of good hospital training. The latter plan to a considerable degree corresponds to one that was proposed by the Legislative Reference Bureau in the State of Illinois and introduced as a bill. The bill, briefly, provided for two groups of nurses, one with a minimum of twenty-seven months' training and certain preliminary requirements, to be known as registered nurse, and the other with eighteen months' training and less preliminary requirements, to be known as registered junior nurse. The courses could be so arranged that the applicant for the course of registered junior nurse could in time, provided she met the requirements, pass on to the higher grade. Surely there would be more applications for the course of registered junior nurse than there would be for the course for licensed attendant, and the superior training of one year and a half or two years would be of some actual value to the hospital and to the community.

As I see it, the reasons against a solution of this problem by the introduction of the licensed attendant to the nursing corps can be summarized as follows: —

1. The number of nurses will be, relatively, greatly reduced in the hospitals and in the community on account of the extra demand, and actually reduced on account of the raising of the standards and requirements.

2. To meet this condition, a large part of what is now considered nursing work will have to be done by attendants.

3. The suggested course for attendants and requirements are not sufficiently high to fit them for this work.

4. The improbability of being able to induce young women, in sufficient numbers, to take the trained attendants' course.

5. The use of a new term that will not be appreciated by the worker or accepted by the public.

My reasons in favor of a graded system consisting either of two or three grades may also be summarized as follows:—

1. It will provide for the highly trained nurse and will arrange for the raising of the requirements and standards.

2. It will arrange for the accomplishment of the usual hospital and community nursing by nurses who will have had suitable and sufficient training.

3. It will act as a stimulus or inducement for young women without the highest preliminary requirements to enter the nursing field, and so provide us with the number required.

4. It will arrange for promotion from one grade to another.

5. It will dispense with the necessity of using an illogical and unappreciated term.

In addition to what I believe to be the correct method as to the nurse or the attendant side of this question, there is another very important consideration connected with the nursing problem. Public schools for some years have included in their curricula preliminary work looking toward the pupils' entering various vocations and professions, but I am told that it is at least not a uniform practice for either grammar or high schools to give courses which may either stimulate the interest of the pupil to take up a nursing course, or to provide any special work of a preliminary character. As it is such a vital matter for the individual and the community, I believe that those of us who truly understand the question should bring it to the attention of the school authorities, so that not only would suitable courses be given in the secondary and high schools, but the importance and necessity of it could be so presented to the pupil that she would feel that to become a nurse is as much an act of patriotism as it is for a boy to become a soldier. It should no longer be considered as a profession that might meet the individual's likes and inclinations, but should be looked upon as a matter of defence and national duty.

Just as it is important for the wise and intelligent citizen to become acquainted with and watch the changes, the theories, and the programs in the political, economic and social spheres, so this matter is important to all and especially to the members of the nursing and medical professions. Keeping in mind the general welfare of the Nation, recognizing our duties as members of allied professions, and realizing the vital importance of this whole question as it affects the individual, the community and the Nation, I believe that a solution of this problem should not be attempted on a basis of expediency or the seeking for higher educational standards alone, but should be solved on a basis of service to and general welfare of the Nation.

A NOTE ON THE PRESERVATION OF CELLS IN SPINAL FLUID AS MEASURED BY THE CELL COUNT.*

BY C. J. CAMPBELL, M.D., L. M. DAVIDOFF, M.D., AND G. P. GRABFIELD, M.D., BOSTON.

It has long been taught that cells in spinal fluid disintegrate so rapidly that such fluids must be counted as soon as possible after withdrawal in order to obtain accurate results.

Emerson,¹ Boyd,² Morris,³ specifically emphasize the fact that the fluid must be "as fresh as possible." Plaut, Rehm and Schottmüller⁴ in their book on cerebrospinal fluid say: "It is necessary that the examination in the counting chamber should take place immediately after puncture, because the cell elements very quickly settle and the more quickly, the more numerous the cells there are in the fluid." Obviously, such a difficulty can easily be surmounted by thoroughly agitating the fluid. We have been unable to find in the literature any definite experiments proving that autolysis takes place on standing under proper conditions, although references to this are sometimes made in verbal teaching.

In a clinic such as this one, where a large proportion of the laboratory work is on spinal fluids, it is often inconvenient to count fluids very promptly; and if cells do disintegrate as rapidly as has been stated, it would preclude the sending of fluids any great distance for examination. We have therefore attempted to find out the keeping qualities of the cells in spinal fluids under various conditions. The results are tabulated in the four tables. The fluids were counted in a Fuchs-Rosenthal chamber, a whole cubic millimeter being counted for each fluid. The cells were stained by adding a small quantity of methyl violet solution (methyl violet 0.1; distilled water 50.0; glac. acetic acid 2.0) in a white blood corpuscle pipette, after the fluid had been *thoroughly agitated*. The stain was allowed to act about ten minutes, the pipette thoroughly shaken, the chamber

* From the Medical Laboratory of the Boston Psychopathic Hospital. Reprinted from The Boston Medical and Surgical Journal, Vol. 185, No. 22, pp. 657, 658, Dec. 1, 1921.

filled, and the cells then counted. Throughout this work no successive counts on a given fluid were made by the same man.

It was first shown (Table I) that fluids counted immediately

TABLE I.*

| Date. | CASE. | Diagnosis. | Count immediately on Removal. | Count Two to Four Hours after Removal. |
|------------|---------------------------|-----------------------|-------------------------------|--|
| 6, 28, '21 | T. S. (ventricular) . . . | General paresis . . . | 3 | 4 |
| 6, 28, '21 | H. G. (cistern) . . . | General paresis . . . | 14 | 16 |
| 6, 28, '21 | A. V. | (?) | 17 | 15 |
| 6, 28, '21 | R. R. | General paresis . . . | 8 | 10 |
| 6, 28, '21 | M. J. | General paresis . . . | 43 | 54 |
| 6, 28, '21 | Mrs. S. | General paresis . . . | 163 | 152 |

* These tables are illustrative of 100 similar cases.

on withdrawal did not change their count when recounted the afternoon of the same day.

We then placed a series of fluids in the ice box (Table II) and counted them daily. Much to our surprise these counts remained unchanged seven to eight days.

TABLE II. — *Ice Box.*

| Date of First Count. | CASE. | Diagnosis. | CELL COUNT PER CUBIC MILLIMETER (DAYS). | | | | | | | |
|----------------------|---------|---------------------------------------|---|----|----|----|----|----|----|----|
| | | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
| 4, 16, '21 | J. F. | General paresis | 8 | — | 10 | 19 | 18 | 17 | 16 | — |
| 4, 4, '21 | G. R. | General paresis | 42 | — | 24 | — | 44 | 39 | 47 | 37 |
| 5, 4, '21 | A. O. | Post encephalitis psychosis | 4 | — | 4 | — | 7 | 2 | 2 | 3 |
| 5, 4, '21 | G. M. | (?) | 6 | — | 1 | — | 4 | 4 | 5 | 6 |
| 5, 10, '21 | C. G. | General paresis | 10 | 10 | 25 | — | 18 | 11 | 11 | 11 |
| 5, 10, '21 | C. McD. | General paresis | 23 | — | 17 | — | 15 | 26 | 31 | 14 |
| 5, 10, '21 | T. S. | General paresis | 11 | 29 | 21 | — | 20 | — | 8 | 23 |
| 5, 10, '21 | E. C. | General paresis | 20 | 23 | 14 | — | 16 | — | 8 | 11 |
| 6, 21, '21 | C. O. | General paresis | 57 | — | 77 | — | 75 | — | 54 | — |
| 6, 21, '21 | E. C. | General paresis | 7 | — | 7 | — | 16 | — | 8 | — |
| 6, 21, '21 | J. K. | General paresis | 11 | — | 13 | — | 13 | — | 12 | — |
| Average | . | . | 18.1 | — | 19 | — | 22 | — | 18 | — |

TABLE III. — *Room Temperature.*

| Date of First Count. | CASE. | Diagnosis. | CELL COUNT PER CUBIC MILLIMETER (DAYS). | | | | | | |
|----------------------------|-----------|---------------------------|---|----|----|----|------|----|----|
| | | | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
| 5, 17, '21 | W. M. | General paresis | 3 | 7 | 3 | 5 | 3 | 4 | 7 |
| 5, 17, '21 | J. B. | General paresis | 7 | 5 | 6 | 4 | 5 | 3 | 4 |
| 5, 17, '21 | Sor. | General paresis | 7 | 6 | 6 | 4 | 2 | 6 | 5 |
| 6, 25, '21 | Kel. | General paresis | 61 | - | 61 | - | 55 | - | 5* |
| 6, 25, '21 | Sal. | General paresis | 3 | - | 4 | - | 3 | - | 4 |
| 6, 25, '21 | Hub. | General paresis | 8 | - | 9 | - | 7 | - | —* |
| Average | | | 15 | - | 15 | - | 12.5 | - | 4 |

* Bacteria.

TABLE IV. — *Incubation.*

| Date of First Count. | CASE. | Diagnosis. | CELL COUNT PER CUBIC MILLIMETER (DAYS). | | | | | | |
|----------------------|-------|-----------------|---|----|------|----|----|--------------------------|----|
| | | | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
| 6, 21, '21 | R. | (?) | 14 | — | 10 | — | 4 | Overgrown with bacteria. | |
| 6, 21, '21 | J. C. | General paresis | 14 | — | 3 | — | 3 | Overgrown with bacteria. | |
| 6, 21, '21 | J. B. | General paresis | 27 | — | 13 | — | — | Overgrown with bacteria. | |
| 6, 25, '21 | C. G. | General paresis | 47 | — | 21 | — | — | Overgrown with bacteria. | |
| 6, 25, '21 | J. B. | General paresis | 7 | — | 2 | — | — | Overgrown with bacteria. | |
| 6, 25, '21 | M. M. | General paresis | 124 | — | 38 | — | — | Overgrown with bacteria. | |
| Average | . | . | 39 | — | 14.5 | — | 1 | | |

The next group (Table III) were left at room temperature and counted daily. It is to be noted that there were several extremely hot days during this period. It will be seen that these cells remained intact on the average of five to six days.

Finally we incubated a few fluids (Table IV) and found that these never lasted more than three days. At the end of twenty-four to forty-eight hours many bacteria were seen (our fluids were not handled with aseptic precaution after withdrawal).

From this study it is apparent that if *non-purulent* fluids be preserved at room temperature or in the ice box and *well shaken before counting*, the cell count will be correct for at least five days after withdrawal.

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THE CARE OF NEURO-PSYCHIATRIC DISABILITIES.*

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SOME GENERAL CONSIDERATIONS AND RECOMMENDATIONS.

The great majority of disabilities falling under the head of neuro-psychiatry require special consideration, for the reason that they involve the behavior of the patient and, thus, his relations with society. They are not simple problems in mechanics, comparable to those brought about by the loss of, or defect in, some organ or portion of the body. They concern the activity of the man as a whole, his understanding of the facts of the world, his feelings, and his attitude toward himself and others. In many instances the disorder itself prevents the patient from making a safe decision as to his course of action, and this selection must often be made for him, sometimes even against his will. Such patients cannot be held responsible for their acts, and what is often spoken of as discipline must be here a matter of treatment for disease, to be prescribed only by a physician trained and experienced in mental disorders.

The disturbance in behavior may or may not be combined with, or, in some instances, due to, disease or defect in the organs of the body; hence, in planning for treatment and rehabilitation, it is necessary to provide facilities for every form of investigation and therapy known to medicine, as well as those specially designed for the treatment of nervous and mental upsets. It should also be noted that even where a disability seems to be more or less adequately explained by the presence of a bodily disease or deformity, the disturbance in function may be modified, enhanced or perpetuated by a disorder of the mental state. It is therefore important that neuro-psychiatric advice be available to hospitals and relief stations devoted to the treatment of general or special medical and surgical diseases and defects. Real bodily ailments, whether serious or not, often serve as a convenient peg on which to hang a whole train of functional disabilities. To treat the former and thus emphasize, and perhaps exaggerate, their im-

* Reprint from the United States Public Health Reports, Vol. 36, No. 43, Oct. 28, 1921, pp. 2665-2677.

portance may do much to retard or even prevent the real recovery of the patient to the full extent of which he is capable.

In the majority of neuro-psychiatric cases there is no definite bodily disease to be combated. The difficulties are those of making an adjustment to the circumstances in which the patient finds himself. These difficulties are in part inherent in the circumstances themselves, but are more largely the result of the personality of the patient. The personality is dependent partly upon inheritance and partly upon training, experience and alterations in the body due to disease or accident to which the patient has been subjected during life. It is possible to modify the circumstances to be faced in various ways, and the personality can also be developed by giving fresh training. Thus we can change the work, home or play surroundings, and we can educate the patient to different habits. It is obvious, however, that such treatment must be individual, and hence requires trained personnel and varied equipment.

For purposes of description, neuro-psychiatric cases may be divided into four groups, which differ from one another in the requirements for treatment. These are —

1. Injury or disease of nerve tissue.
2. The psychoneuroses (or neuroses).
3. The psychoses (or insanities).
4. Certain constitutional nervous deficiencies.

1. Injury or Disease of Nerve Tissue.

Group 1 is comparatively small in size and relatively simple in its requirements. It includes such cases as gunshot and other accidental injuries to nerves and the damage produced by diseases of the nervous system, such as meningitis, "strokes" of paralysis, etc. Uncomplicated disabilities of this kind can be adequately treated in general hospitals or relief stations.

It should be especially emphasized, however, that psychoneurotic additions are not at all infrequent and are very likely to be overlooked. All such cases should therefore be studied with this possibility in mind.

2. The Psychoneuroses.

In point of actual numbers this group is by far the largest, but for hospitalization it should be extremely small. It includes the great majority of those conditions which were loosely and erroneously described as "shell shock" during the war, the

“nervous breakdowns,” hysteria, neurasthenia, anxiety neurosis, psychasthenia, and the so-called “functional diseases” of the heart, stomach and other organs.

In essence, the neurosis is a “way out” of some intolerable conflict or difficulty. The feelings of stress, apprehension and worry which belong to the conflict are interpreted by the patient as evidences of disease or injury, the origin of which is referred back to some accident or illness (gassing, influenza, overwork, etc.) of the more or less recent past. The suffering is genuine and none the less real because the symptoms are ascribed to disease or injury. The case of a soldier seen at one of the hospitals will illustrate. This man served as a commissioned officer and was slightly gassed. His prewar social status and occupation were those of a railroad brakeman and to these he was obliged to return upon discharge. He did not openly admit, even to himself, that this loss in authority and social dignity and the return to a monotonous routine were unbearable and distasteful. He could not afford, or could not see his way to manage, to take vocational training under the conditions of section 3. He fretted and worried, was unhappy and dissatisfied, and sought an explanation for these feelings other than the facts which he was unwilling to accept. The “gassing” experience offered a way out. He experienced upsets in his breathing as part of his emotional state, but wondered if they were not due to the damage done by the gas. The more he watched them, the worse these feelings became, and soon they were so severe that he had to give up work and thus was relieved of his distasteful and humble position.

The treatment of such cases must consist in the discovery of the conflict or difficulty, the convincing of the patient as to the real facts, and then obtaining his assistance to find some more satisfactory method of dealing with it which is within his capacity. Obviously, this must be individual and cannot be applied to patients in groups or in a routine way. It requires skill and tact, often with the devotion of considerable time upon the part of the physician to this one patient. It is therefore not surprising to find that the field officer who has many patients to see and no special clinic to which to refer such cases will immediately recommend hospitalization.

To place such a patient in a hospital is to confirm his belief in the existence of serious disease or damage. Furthermore, it very effectually brings a cessation of the responsibilities and needs

for adjustment which brought about the disorder. It is often extremely difficult to discharge such patients, and it is a much simpler problem to keep them out of a hospital. No man can be taught to carry a heavy burden by being relieved of the necessity for carrying anything at all. It is true that in some instances the burden may be more than the shoulders can bear. The shoulders must then be trained to bring them to their full strength. If then it be found that the load is too great, steps may be taken to diminish it, but it must not be removed entirely unless we desire to retire the individual from active participation in life.

We were somewhat surprised during our visits to the hospitals to observe many patients with marked hysterical symptoms. As a rule, these rapidly disappear under appropriate treatment, and this observation served to confirm our belief that hospitalization should be avoided. In fact we are very strongly of the opinion that *special hospitals for the treatment of psychoneuroses will eventually be found unnecessary, provided adequately staffed out-patient clinics are established*. Short residence in a hospital may be necessary in a small proportion of cases, but these could be cared for in the diagnostic hospitals of the district. One of us (Dr. Thom) has recently had under treatment in an out-patient clinic 680 psychoneuroses in ex-service men. Of this number, only a little over 4 per cent needed even a short time of hospital residence.

The above considerations also emphasize the importance of seeing that psychoneurotic patients, if they are to be hospitalized at all, are not sent to an improvised hospital in which facilities for treatment are not at once available. So much depends upon the atmosphere and the absence of incentives to loafing that hospitalization under such conditions will inevitably do more harm than good.

3. *The Psychoses.*

While Group 3, the psychoses, is actually smaller in numbers than Group 2, its needs for hospitalization are many times greater. The psychoses differ from the neuroses in that there is a definite loss of touch with reality upon the part of the patient. He does not merely regard himself as sick and incapacitated, but his conception of the facts of the world, of himself, or of both are definitely distorted from the reality. As a direct consequence, the behavior is not appropriate to the actual facts of the surroundings, and there is likelihood of the performance of acts which may harm the patient or others. For this reason the

patient must usually be removed from ordinary social life, and it is often necessary to restrain his liberty.

The great majority of psychoses must be treated, often for long periods, in a hospital. The requirements to be met are fairly well established and need not be discussed in detail here. In fairness to the medical officers of the hospitals now in operation it should, however, be pointed out that special arrangement and equipment of wards for the care of acute mental upsets are very important. The improvised facilities provided by the hasty modification of buildings constructed for an entirely different purpose will nearly always be deficient in some important particulars. It cannot be too strongly urged that every effort be made to erect hospitals built for the purpose, at the earliest possible moment, and thus do away with the necessity which now exists for doing the best that can be devised at short notice with existing structures. The quieter and less disturbed mental cases can be treated in buildings of very simple type; but since there is always the possibility of the recrudescence of acute disturbance, there is always the likelihood of the need for the provisions above mentioned.

In many psychoses there is some underlying disease of the nervous system, whereas in others little has as yet been definitely established. Many seem to arise upon the basis of conflicts and difficulties similar to those indicated for the neuroses, but with, perhaps, an added factor of poor construction either from the start, *i.e.*, from birth, or as the result of damage from disease or injury during life.

The information obtainable from the patient as to the history of his life and the factors which have led to the mental breakdown is often incomplete, unreliable or even lacking. To do the patient justice, it is therefore essential to supplement by outside investigation. For this purpose a well-organized social service is necessary. At present this is being performed by the American Red Cross, but there are so many ways in which social service is needed that there is ample justification for the development of a special service with thorough training in neuro-psychiatric work. Such a social service would act not only to collect information, but also to assist in the rehabilitation of the patient during the difficult period following his release from the hospital.

4. *Constitutional Nervous Deficiencies.*

As the title implies, this group includes cases which were not normal when they entered the Army. Yet, in many of them, Army service is responsible for the present degree of disability. Prior to enlistment the man had found a niche into which he fitted. Service has broken this adjustment, has perhaps aroused ambitions and dreams incapable of realization, and has created cravings for companionship and other things which were previously unknown. The principal problem is therefore one of replacement in a suitable environment and but rarely one of hospitalization.

Three different types may be mentioned which present somewhat varying requirements. They are (a) the feeble-minded, (b) the psychopathic personality (constitutional inferiority), and (c) the epileptic.

(a) *The Feeble-minded.* — The feeble-minded man who was accepted in the service is in practically all cases among the higher grades of defective. He is capable of placement in some activity, though the effort to carry this out may have to be repeated many times before a finally successful adjustment is secured. In attempting this placement and vocational training it is essential that the capabilities of the man be very carefully studied. An unwise selection may result not only in discouragement of the patient, but also in greater disability than was present at first. To take up responsibilities too heavy for accomplishment lays a very excellent foundation for the development of a psycho-neurosis in the feeble-minded just as it does in those with higher intelligence. Selection of vocation and environment should be made by an expert with all the advice he can get from the physician who has really studied the patient. It cannot be successfully made in a fifteen or a thirty minute interview by some one who knows little more than that there is a demand to fill certain jobs. We believe very strongly that these efforts should be carried out with the advice and supervision of the out-patient clinic which is responsible for the treatment of the patient.

(b) *The Psychopathic Personality.* — The psychopathic personalities present some of the most difficult problems of all. Such persons may show comparatively low intelligence but they may also grade even above the average upon test. The essence of the

defect lies in the personality. There appears to be inability to use the intelligence to guide the behavior. The man may seem to have the knowledge which should enable him to select what to do with fair judgment and yet he does not use it. He may perform all sorts of ill-considered acts to gratify the appetites of the moment without consideration of the consequences even though he knows them when questioned. He may commit delinquencies of all degrees of seriousness from vagabondage, lying, stealing and forging to murder. It is often alleged that he is insane and he may find his way to a hospital where he is a constant source of trouble, frequently escapes, and is always a menace. Often such persons are plausible and superficially shrewd, but they seem to be incapable of steady application and soon tire of any task. In numbers the group is fortunately small, but the potentialities for evil are large. No State has yet succeeded in dealing with this group satisfactorily.

(c) *The Epileptic*. — The epileptic in very many instances can get along in the community, especially where compensation and supervision through an out-patient clinic are possible. Such a person is severely handicapped from an industrial point of view, more so than many with more obvious defects. In a certain proportion of cases when the fits are frequent or the patient has difficulty in adjustment due to personality, segregation from ordinary society is advisable. The character of the institution to which he is sent should be that of a model community with its own industries, amusements, etc., rather than a hospital. In the case of epilepsy, probably more than in any other group, it is important that the patient be not sent to an incomplete and improvised institution. Most epileptics are impulsive and inclined to grumble, but these traits are rapidly increased by idleness and lack of attention. In constructing buildings to house epileptics, the possible dangers resulting from the falling of patients should be kept in mind. We believe that such an institution should be planned and built, but this must be secondary to the more urgent needs for hospitals for psychoses. Epileptics with psychoses will go to these hospitals.

The above considerations as to the nature and needs for treatment of neuro-psychiatric cases lead us to make some general suggestions with regard to the organization of the work. Since the neuro-psychiatric work must be co-ordinated with the other medical work, the outline here given does not deal only with the

former. The outline offered is purposely very general and open to wide variation in regard to details; but it contains some points which we consider essential to the efficient operation of the neuro-psychiatric units.

PLAN FOR THE ORGANIZATION OF THE TREATMENT OF DISABLED EX-SERVICE MEN.

1. The work in each district is subdivided into administrative and professional branches. (See chart.)

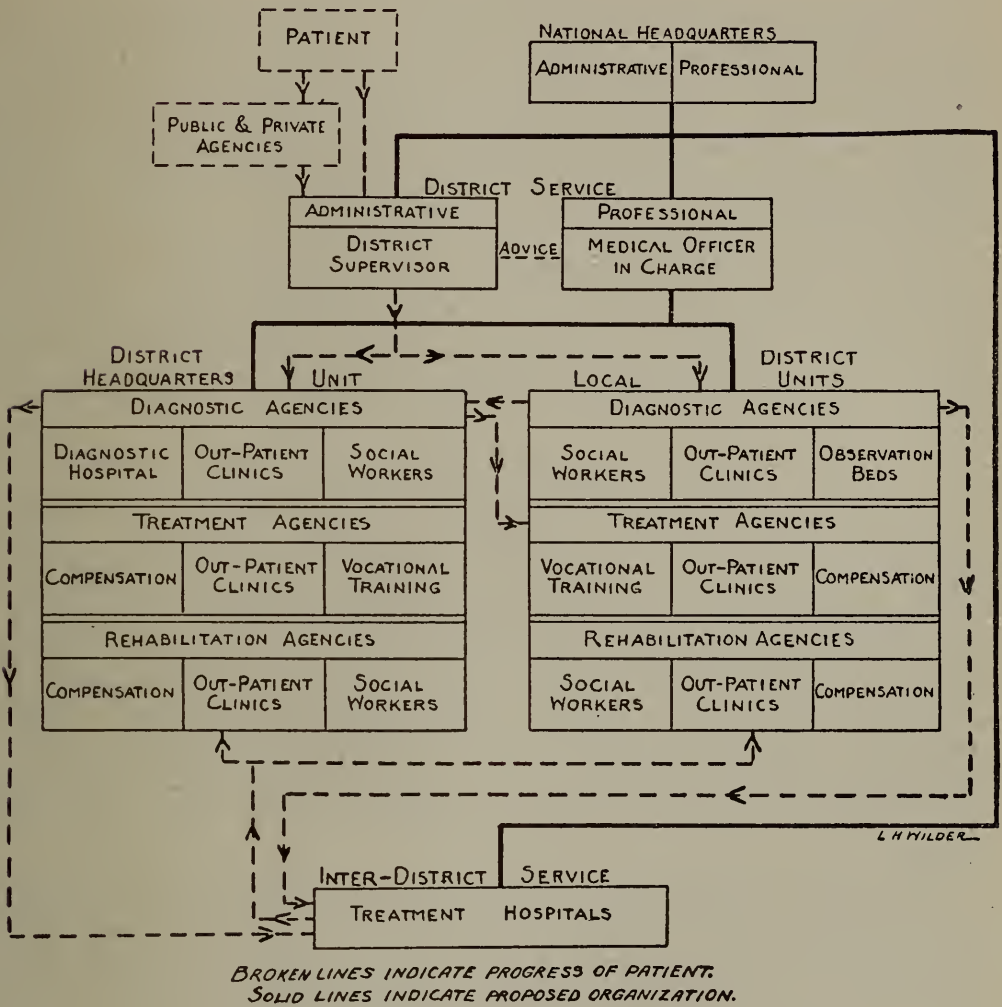
The *administrative branch* makes the first contact with the patient, either directly or through some public or private agency. The patient is then immediately referred to the most convenient out-patient clinic. This branch also determines the compensability and, under the advice of the professional branch, settles the rate of compensation, issues all necessary orders, and makes all arrangements for transfers from or to headquarters unit, local unit or treatment hospital.

The *professional branch* is provided with a series of medical units located at convenient points throughout the district. One of these, the headquarters unit, is stationed at the headquarters of the district, is subdivided into special and general medical subjects, provided with sufficient hospital accommodation for the detailed study and short term treatment of such cases as may need it (here called the diagnostic hospital), and has access to specialists in all fields who need not always be on full time. The local units will be of suitable size for the communities they serve, will be provided with a few beds for study or temporary hospitalization, probably by contract with a local hospital, and will hold clinics in the specialties only as frequently as may be necessary. Patients needing more detailed and special study than can be given at the local unit can be transferred to the diagnostic hospital of the headquarters unit. Full-time neuro-psychiatric consultants will not be needed at the local units unless these units be large. They can sometimes be appointed from the membership of local physicians, or the clinic may be served by full-time specialists traveling from the headquarters unit.

It will be noted on the chart that compensation is given as a means of treatment or rehabilitation. This view of the matter is considered essential. Vocational training has also been placed among the treatment agencies. It should be possible to prescribe

training for portions of a day as well as for a full day so that it may be used in the treatment of patients who are unfit for a full day's work. The term rehabilitation is here used to apply only to the replacement of the patient in full citizenship or such

ORGANIZATION OF PROFESSIONAL CARE OF VETERAN BENEFICIARIES



degree of self-support as may be possible when all means of treatment have been exhausted.

2. Hospitals for prolonged treatment, especially the psychoses and tuberculosis, will probably serve several districts. On the chart they are indicated as treatment hospitals. Patients will be sent to these hospitals upon the advice of the medical officers of the out-patient clinics, either headquarters or local, and will

always be discharged back to the care of the out-patient clinic, which will give any further treatment that may be indicated and will supervise the rehabilitation.

It is essential that arrangements be made to transfer copies of the medical records of the patient whenever the patient is transferred from clinic to clinic or from clinic to hospital or *vice versa*; otherwise, many unnecessary examinations must be made which are annoying to the patient and cause much waste of time and effort.

3. From the description and chart it will be appreciated that, under this plan, *the out-patient clinic is the center of the service*. This, we believe, is the only logical solution; it is especially important for the neuro-psychiatric work. Many cases are now being hospitalized to their own detriment because of the absence of facilities for giving treatment without it.

4. Whatever plan of organization be adopted we would especially emphasize the importance of establishing the very closest co-ordination between the agencies which have to do with treatment, compensation and vocational training.

Trained Neuro-Psychiatric Personnel.

In our opinion the greatest need of the service at the present moment is for trained personnel. It is an unfortunate fact that neuro-psychiatric medical officers, nurses, social workers, etc., exist only in limited numbers, in no way commensurate with the demands. The plan of work must therefore be made with the greatest economy in mind. All competition between various agencies of the government should be eliminated and the fullest possible use should be made of civilian experts on a part-time basis.

The plan of organization suggested above makes this possible, as the largest field is at the headquarters unit of the district and is located in the largest center of population. In selecting the site for out-patient clinics and diagnostic hospitals, convenience to consultants should be considered. In selecting assistants it should be noted that the character of the work most needed in the out-patient clinic is different from that in the treatment hospital. The latter resembles more, in the class of work, the State hospital. The former will have a large number of psycho-neuroses and also recovered psychoses for rehabilitation.

To supplement the available supply and to prepare for the increased demand which will come with the opening of new

hospitals and out-patient clinics we recommend very earnestly the *establishment of a training center* for medical personnel. This center must be accessible to university instruction and also to field facilities. Any of the existing psychopathic institutes, if provided with out-patient clinic facilities, would be suitable and doubtless willing to co-operate.

Every effort should also be made to interest medical students and recent graduates in the field of neuro-psychiatry and to place before them the opportunities offered.

Physiotherapy, Occupational Therapy and Vocational Training.

In our recent visits to the hospitals of the service, and also from other experience, we have been much impressed by the need for more exact definition of the terms physiotherapy, occupational therapy and vocational training. In the hospitals of the service, *physiotherapy* is placed under the direction of a chief of reconstruction, who may or may not be a physician. Physiotherapy, as the name implies, is a form of medical treatment and, just as much as drugs or surgery, it should be prescribed to suit the needs of the individual patient. Furthermore, such prescription should be given by the physician who has charge of the treatment of the patient. Special technicians to carry out the prescriptions are necessary, but they should bear the same relation to the patient and physician as does the nurse or the pharmacist. Nothing is to be gained by appointing a physician to attend only to physiotherapy more than would be the case were a physician appointed to attend to the giving of drugs.

It is probable that much of the present confusion is brought about by the fact that many of the physicians know little about the technique of physiotherapy and are therefore diffident in prescribing it. But the solution of this difficulty lies in giving training to the physician. The disabilities of the neuro-psychiatric patient, except in the very small group of nerve injuries, are mental and not mechanical. They cannot be treated mechanically as can many disabilities of surgery and medicine. The physician is treating disorders of behavior and his remedies must deal with behavior.

As now practiced there seems to be but little distinction made between occupational therapy and vocational training. This is not merely of academic interest, but is fraught with the possibility of real harm to the patient, besides the development of

conflicts among personnel. The two activities are in reality entirely distinct.

Occupational therapy is not in any sense an effort "to make something." The purpose with which it is employed is quite variable, as the following classification will indicate. It may be prescribed (a) as a diversion; (b) because it brings into play certain muscles or joints which are functionally damaged; (c) to produce sedation or stimulation; (d) as an education in habits of application. The first two have more place in a general than a neuro-psychiatric hospital which employs occupational therapy more especially for the types (c) and (d).

The *product* of occupational therapy is *the effect* it has upon the patient. The articles produced in the process are, like the copy books of the child in the primary school grades, of no importance. The types of occupation selected are chosen with several things in view; they are interesting; they require a certain degree of steady attention which can be varied by varying the occupation; and they possibly contain elements in technique which may later be useful in industry. They may serve to develop hobbies and recreative interests which will be continued in after life; but the question of value in the product does not enter. It is therefore decidedly harmful, as well as time-consuming, to insist upon a system of accounting for the articles which are produced. Sometimes destruction of good materials is an important part of the therapy. It is true that many of the articles made can be turned to useful account, and this fact in itself has some value in therapy. But the important point is that the patient is affected by the usefulness, sees the articles in use, uses them himself, or even finds by selling them that he has done something worth while. The value to the government of the articles, which the patient must duplicate if he is to keep one of them for himself, is practically nil.

Vocational training, on the other hand, is a training of the patient to carry out some technical operation and thus to give him a means of earning a livelihood. The *product* is therefore *the patient placed in industry*. Articles produced in this process must have a market value, and there is absolutely no place for the merely beautiful but fancy products, the value of which is personal and largely artificial.

Much of the work being conducted under the name of vocational training in neuro-psychiatric hospitals (to which alone we

are referring) is nothing but the routine application of procedures employed in occupational therapy. As a rule, also, they are applied to all alike without consideration of the needs of the patient. This situation is more or less clearly recognized by the workers themselves, and they have introduced the term "pre-vocational training" in order to explain the fact that all that is produced is a beautiful exhibit while patients are not being placed in industry.

We are convinced that the true explanation of this situation is that there are but few neuro-psychiatric patients in hospitals who need, or are capable of, vocational training. These few are the convalescents or those considered to have recovered to the fullest extent possible from the effects of the disease from which they have suffered. It would therefore seem desirable to allow the hospital, under the direction of its own physicians, to carry out its occupational therapy up to the point where vocational training is indicated. The patient may then be sent to a training field, still under the supervision of medical officers in the locality of the field, or, if there is a sufficient number requiring the same kind of training, an instructor and aids could be sent to the hospital.

Treatment, Training and Compensation.

There is no aspect of the problem which has to do with the rehabilitation of the ex-service man, excepting that of medical personnel, which is of such vital importance as the close co-operation between the departments which have to do with treatment, training and compensation. Perhaps to one who is not in actual contact with neuro-psychiatric cases in a medical way, the logical sequence of events would be to restore the patient to the highest degree of efficiency by therapeutic measures before beginning to train him for some trade or profession in order to establish his economic independence. Under this order of procedure each department would work quite independently of the other, and the man would be shifted from one to the other whenever a cross section of the individual indicated the need for a change. However, as all of us who are dealing directly with the ex-service man know, this cross-section method has proved a definite failure. What is needed is a longitudinal section of the patient's life in order that we may consider his past experiences, his present needs, and his future possibilities. For example, if we are dealing with a mentally deficient individual whose war experiences have rendered him incapable of adjusting himself to

his present environment and conditions, although his history prior to the war shows that he got along fairly well in the community, we cannot neglect his present needs, which may mean the actual necessities of life. These, of course, can only be met by compensation; and while future possibilities for this patient may or may not lie in training, certainly in such a case training can only be of advantage if selected after a careful study of the mental equipment and temperamental fitness of the prospective trainee.

The question of who is best fitted by reason of experience, training and opportunity to decide upon the presence or absence of the particular qualities which account for success or failure in an individual, is quite debatable, but, other things being equal, that is, intellect and opportunity for observation, it seems that the psychiatrist who has made a study of the particular case is best qualified to advise regarding the type of work for which the individual is best fitted by virtue of his physical and mental equipment, as well as by temperament and disposition.

We very frequently find the man with a mental age of twelve to fourteen years struggling along in some trade or profession which is obviously not within his grasp. The more ambitious and persevering the man, the greater the conflict between his ambition and his achievements, and sooner or later, we find him seeking refuge in a neurosis. The same is true when an individual fitted for manual work begins to take up accounting; when the lad who craves outdoor life finds himself shut up in a factory; when the man who is quick and impulsive is forced to do work which requires caution and deliberation; or when the individual who works well under supervision suddenly is thrown into a position that demands responsibility. All of these individual questions must be considered when dealing with problems of vocational guidance.

It is not intended to convey the idea that the neuro-psychiatrist should take the place of an expert trained in the problems of vocational guidance, but that he should advise with this expert or furnish him with all the data at hand pertaining to the prospective trainee's mental equipment and temperamental fitness for general types of work. It seems to us that in this way many of the glaring mistakes that have occurred in the past will be obviated. It may be well to repeat what has already been said elsewhere, that a large percentage of the relapses among the neuro-psychiatric cases in training are directly due to being

shunted off into some trade or profession for which they are unsuited.

Much unnecessary time and money may be spent by the government in recommending treatment and training for a certain group of applicants for compensation when it is perfectly obvious that treatment will be of no avail and training is not feasible. The problem of compensation and supervision by some social agency might just as well be met at once. This will allow the applicant to plan his future along practical lines, and will not keep him upset by repeated disappointments which tend to aggravate his condition and make his adjustment more difficult. For example: an epileptic first received temporary total disability compensation of \$80. In an effort to increase his income he applied for Federal Board training and was successively placed in a machine shop, a tinsmith shop, a garage, and finally a commercial school. This claimant is an ambitious, earnest sort of chap, of very limited intellectual capacity, and his repeated failures have completely destroyed his morale. Just recently he has been notified that he has a total permanent disability, but his reaction to this, at this period in his dealing with the government, is one of discouragement and discontent. It seems to us that if this situation had been correctly sized up in the first place, this claimant's attitude toward life in general and the government in particular might be quite different.

WHAT AN ADEQUATE MENTAL HYGIENE PROGRAM INVOLVES FOR THE STATE HOSPITAL SYSTEM.*

BY GEORGE M. KLINE, M.D.,

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It is quite apparent that the need for increased activity in relation to mental disease and defect is generally recognized, as is evident in new and improved legislation being passed and much larger appropriations made for the better and more scientific care of patients. The initiative for this change may quite properly be credited to a rather small group of persons, and often their recommendations and requests meet with much opposition. It must be conceded that gross misconceptions regarding the fundamental facts of mental hygiene exist in the minds of the laity. "Peculiarities" which in many instances may indicate mental disorders have no apparent connection in the minds of many, including physicians, with mental disease. It is both interesting and significant to note in this connection that the more common causes of mental disease as given by the laity in connection with patients sent to our State hospitals remain quite unchanged. Such causes as "love affairs, family troubles, overwork, worry, religion," etc., are still commonly used.

Only those who have been long associated with mental patients and their problems appreciate the difficulties which they encounter in the community, before hospital residence, and after their return to the community. Because of this stigma, many otherwise intelligent persons avoid seeking early help for themselves or their relatives until more serious conditions develop. For this reason many deny facts of heredity that have a bearing on mental disease. In securing employment for discharged mental patients, the psychiatric social worker is often beseeched to conceal all facts pertaining to a mental breakdown because of the very grave difficulties which they must otherwise encounter. The lack of information relative to the terminology used in psychiatry is added evidence that mental disorders are meaning-

* Read at the seventy-sixth annual meeting of the American Medico-Psychological Association, Cleveland, Ohio, June 1 to 4, 1920.

less to the general public. Even the more common terms such as "senile dementia," "feeble-mindedness," "softening of the brain" are strangely misunderstood. To a large majority of the people, including physicians, definite mental disorders are practically meaningless and appear to be confused with temperamental difficulties. A recent article by Donald A. Laird, entitled "Does there exist a Need for a Program of Education in Mental Hygiene?" indicates very clearly the status of society to mental hygiene knowledge, and perhaps explains part of the opposition met in efforts to bring about changes in our laws.

Only recently a special recess committee of the Massachusetts Legislature named to investigate conditions prevailing at State institutions, calling special attention in their report to the enormous sums spent annually for the maintenance of State institutions, made this encouraging comment.

The sum spent for research into the causes of disease and conditions resulting in the need of these institutions is negligible. The committee believes that research work in the field of mental disease and defect should be pursued aggressively on a much larger scale. In this way only can it be hoped to make available information that will prevent, in the future, a heavier burden upon the State.

Unquestionably the startling and unlooked for results of the neuro-psychiatric examinations incident to mobilization, the work of the neuro-psychiatrists throughout the war, and the number of mental cases among the war risk beneficiaries have served to direct attention to the importance of psychiatry and the great need for a mental hygiene program.

It is through the State hospital system and more especially the component part of such a system — the State hospital — that information regarding the causes, treatment, prevention of mental disease and mental defect is readily gathered.

For this reason the State hospital is the logical center from which information regarding mental hygiene should be disseminated. The State hospital, especially since the advent of outpatient clinics and psychiatric social service work, can no longer afford to be a thing apart from the community. It has much, in fact is under definite, obligation to contribute in every possible way to a mental hygiene program. Years ago in a report dealing with the best method of providing for the insane, made to the Massachusetts Legislature, this obligation of the State hospital was recognized, as is evident from the following statement: —

It should be a center of instruction and counsel in mental hygiene, prevention of insanity and after-care of discharged patients. The poor of the district should be encouraged to seek its advice, and granted free consultation while they may properly remain at home. An out-patient service similar to that of the general hospital should be maintained. There should be co-operation with local charitable agencies in ascertaining home conditions and in the endeavor to better or change the unsuitable. Thus incipient mental disease would be brought to notice, dangerous tendencies discovered in time to erect safeguards against violence, and public confidence won.

From the foregoing it would appear that the work of the State hospital system in fitting into a mental hygiene program is largely in the direction of education. This service is now very largely extended into the community through out-patient clinics and psychiatric social service. In Massachusetts, 14 State hospitals have out-patient departments, and clinics are held under the auspices of the hospital authorities in 28 cities and towns. In this way, this service is extended to practically every community of the State. The functions of these clinics and the work of the psychiatric social service departments have been dealt with in previous articles. The Department of Mental Diseases now employs a director of social service, who supervises the work in the hospitals throughout the State. At the present time 19 social service workers are employed by the hospitals and in addition 9 student workers. Special mention might be made of an act recently passed enabling the presiding judge, in his discretion, in order to determine the mental condition of any person coming before any court of the Commonwealth, to request the assignment of a member of the medical staff of a State hospital to make such examination, without charge, as may be deemed necessary. It is gratifying to note that more and more requests for this service are being made. It is a permissive act which it is hoped will speed the day when a competent psychiatrist will be attached to each court.

Still another act of vital importance to an adequate program in the handling of the feeble-minded problem has been passed. It requires the school committee of each city and town to ascertain, under regulations prescribed by the Department of Education and the Department of Mental Diseases, the number of children three or more years backward, and where ten or more children are so retarded, shall establish special classes.

Provision was made for the establishment of free clinics and

a registry for the feeble-minded. In accordance with this legislation, travelling clinics in connection with the schools for the feeble-minded, in charge of a psychiatrist assisted by a psychologist, social service worker and necessary clerical help, will aid in the mental examination of such groups of retarded children as are reported. Supervision by a central authority of neglected feeble-minded in the community is yet to be provided for as an important phase in the handling of the feeble-minded program.

In disseminating knowledge relative to mental hygiene, the opportunity should not be overlooked by the State hospital to not only invite the general practitioner to attend the daily staff meetings but, failing to attend, to send information regarding the diagnosis, prognosis and present status of each patient that he has committed or advised to undergo hospital treatment.

Too frequently is noted the apparent indifference of the general practitioner to mental patients. Their interest can readily be gained if they are kept advised regarding their former patients. In this way their co-operation in after-care work can be had the easier, and a friendly attitude toward the institution engendered.

The startling lack of knowledge in psychiatry on the part of the medical profession presents a most serious problem, and unless active measures are taken to remedy this defect, not only may little advance in mental hygiene be hoped for, but the standard of care of patients in State hospitals will inevitably suffer and eventually amount to little more than custodial care.

The crying need of State institutions is for trained men. The relative importance of psychiatry to other branches in medicine is not difficult to establish. Not only should every medical school be required to give adequate training, but it should be obligatory for every candidate for medical degree to pass an examination in psychiatry.

The State hospital system, through the establishing of psychopathic hospitals, should be a necessary adjunct to the medical school in the teaching of psychiatry. This interdependence of the State hospital system and medical school is better illustrated by an arrangement under consideration in Massachusetts between the Harvard Medical School and the Psychopathic Department of the Boston State Hospital, which will become a separate institution in the State hospital system, under the Department of Mental Diseases.

The director of the Psychopathic Hospital, under the contemplated arrangement, will be professor of psychiatry at Harvard

Medical School. A similar pooling of interests is also under consideration whereby the professor of neuropathology would direct the scientific research laboratory work of the Massachusetts Psychiatric Institute. The psychopathic hospital, receiving patients for intensive study, care and treatment, with opportunities for laboratory research work in neuropathology, would then occupy a position in the medical school as important as the medical, surgical and other clinics.

The functions of these clinics, as aptly defined by Kraepelin, are attendance on the mentally sick, instruction to students, and places to which criminals suspected of mental disturbance may be sent for observation, the dissemination of medical views on social questions, and correction of existing prejudices regarding insanity, to serve as a connecting link between the larger remotely situated institutions and scientific research and scientific investigation of all problems connected with the study of mental diseases.

It is obvious that when medical schools require graduates to be as well informed in mental diseases as is now required in the practice of medicine, many mental disorders will be considered at their source by the general practitioner.

Accordingly there should be a desire and willingness on the part of a State hospital system to co-operate with medical schools in the teaching of psychiatry. The need of trained men is so great at present that it is believed this association might very properly exercise its influence in every possible way and support every effort to the end that an adequate course in psychiatry be given in every medical school.

MENTAL HYGIENE.*

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Mental health is as important to the individual and to society as is physical health, and it is fitting that mental hygiene should have a place in a symposium on general hygiene and on other phases of special hygiene.

The aim and purpose of mental hygiene, as defined by the Massachusetts Society for Mental Hygiene, is to work for the conservation of mental health; to help in raising the standards of care for those suffering from or in danger of developing mental disease; to promote the study of mental disease in its various forms and varieties; and to disseminate knowledge concerning its causes, treatment and prevention.

In other words, mental hygiene means the correlation and application of all available knowledge concerning the causes, prevention, treatment and care of all forms of mental disease and defect.

The vastness of the field for mental hygiene is partially indicated by the existence of the twelve great State hospitals for the insane in Massachusetts, with 15,000 patients under treatment, the majority of these patients representing those whose insanity began when they were young. Over 3,000 new patients are admitted annually. One person in 259 of the inhabitants of the State are patients in these hospitals. The cost of these hospitals for 1919 was over \$6,000,000, representing one-half of the State tax, and more than one-fourth of the State expenditures.

Massachusetts also has two schools for the feeble-minded, with 2,500 patients, and hundreds applying for admission. There are over 12,000 persons in the State known to be feeble-minded, with the probability that the actual number is at least twice that number.

There is one hospital for epileptics, with 1,145 patients. The State is also called upon to support hundreds of inebriates and mentally defective delinquents in its penal and pauper institutions.

* Read before the Massachusetts Medical Society, June 9, 1920. Reprinted from the Boston Medical and Surgical Journal, Vol. 183, No. 27, pp. 759-761, Dec. 30, 1920.

The patients in the hospitals named do not include the many cases of mild insanity cared for at home, perhaps masquerading under the friendly diagnosis of nervous prostration or neurasthenia, or coming under the head of the minor psychoses or of the psychoneuroses.

Massachusetts has always been generous in its treatment of the mentally sick, and the writer believes that the present standards of hospital care in this State compare favorably with the best in the world.

It is a striking fact that the average patient who is committed to a State hospital or a school for the feeble-minded has not consulted a physician for his mental malady until the physician is called upon to sign the commitment papers. In other words, the physician is seldom called upon to treat incipient stages of mental diseases, although such diseases are often amenable to treatment before they are fully developed. In fact, the prognosis as to cure is usually in inverse ratio to the duration of the disease.

The reasons for this delay are many and complex. Personal and family pride is largely responsible. Mental disease to many people still connotes personal and family inferiority, perhaps a persistence of the medieval idea of demoniac possession.

A mistaken interpretation of the ideas of heredity as applied to mental disease develops a sort of fatalism and of horror at the appearance of mental trouble, whereas an intelligent understanding of the exact family liability is often sufficient to prevent the dreaded event.

Some forms of mental trouble may be hereditary and other forms are never hereditary. Even with hereditary tendencies as a predisposing cause, a definite exciting cause or causes must usually be added. The vast majority of the ancestors of every individual were normal and sane. Heredity tends more strongly towards health than towards disease. A person with mental trouble in the family may usually escape mental disease by proper surroundings, healthful and temperate activities, and proper mental and physical habits. Indeed, most forms of insanity do not appear suddenly, but develop gradually and might have been seen earlier by close observation.

Certain forms of insanity are probably incurable from the beginning, but nearly one-fourth of the patients admitted to the hospitals are sent home recovered. Many forms of mental disease are due to known and preventable causes. Many of the

15,000 persons now in our hospitals might have remained sane and lived useful and happy lives if they or their friends had known certain facts and acted accordingly.

The art of mental hygiene largely devolves upon the general practitioner, who alone has access to these patients in their pre-psychotic or highly curable period. Even the best of our medical schools pay very little attention to the teaching of psychiatry compared to its importance and the size of the field. The average physician has received very little instruction as to the signs and symptoms of the pre-psychotic stage, as shown by minor failure of adjustment and adaptation, a distaste for former work and interests, change of habits and feelings and emotional reactions.

The psychiatrists themselves know far too little of the juvenile and adolescent danger signals of future mental disease. The high school period often shows signs of mental or social distress, which, if recognized and acted upon, would prevent future mental breakdown. And the disciplinary problems of any college include many students who need the physician or the psychiatrist rather than the pedagogue or the disciplinarian or the moralist.

White has aptly said that "childhood is the golden period of mental hygiene," and yet in public and private schools very little application has been made of the science and art of mental hygiene. The child is expected to adjust himself to the work of the school. Little attention is paid to his heredity, his inferior or superior intelligence, or to innate personality traits, like emotional instability, egocentric tendencies, feelings of inferiority, special aversions, special disabilities and his keen desire for adequate self-expression. In reviewing the school history of psychotic patients, it is often found that even in school life marked deviations of behavior and emotions and feelings occurred. We shall eventually prevent many cases of potential mental disease by proper recognition and understanding and management of these forerunners of mental instability in the school period. No field in preventive medicine offers a more promising opportunity than this teamwork of the psychologist, the psychiatrist, the teacher and the family physician.

Many juvenile and adolescent problems are caused or intensified by poor parental management. Often too much has been expected in the way of school achievement, social success, in earning capacity, or they have had uncongenial work, too

little recreation, limited interests, lack of proper sex knowledge and understanding, etc. These cases often clear up at once when the proper readjustment has been made by taking off the load, perhaps by a new school, different studies, a new job, new interests, a good talk with a trusted physician, and perhaps an entirely new environment.

Untreated, such cases often become permanently warped and disabled, if not actually insane. There is a great need for an authoritative manual on "Mental Hygiene for Parents," comparable with Dr. Richard Smith's book, "Baby's First Two Years." Parenthood *per se* does not always imply inspiration in fitting boys and girls to meet the complex problems of our modern civilization.

The employment and personnel managers of our great industrial interests are keenly alive to the significance of the mental factors in problems of individual and group unrest and turmoil in their organizations. A man with a paranoid personality of wordy type, with capacity for leadership, finds a fertile field in the many unstable and suggestible mentally inferiors to be found in any large group of men. Some such combinations help to explain "mob psychology," as expressed in rioting and violence.

Within a few years the State Department of Mental Diseases has established out-patient clinics in many cities of the State, conducted at regular times by the staffs of the various State hospitals and schools for the feeble-minded. Such clinics are now available all over the State. They are being used freely by many patients who would not go to State hospitals, and many of whom are going through the incipient or most curable stages of mental disease. The Psychopathic Hospital in Boston also receives presumably mental patients for thorough examination and advice, and also conducts a daily out-patient mental clinic. There is an increasing tendency for physicians to refer mental problems to these out-patient clinics. Of course, there is no money charge for the advice given at these clinics.

The last Legislature passed laws requiring a mental examination of all school children found three or more years retarded in school performance, and requiring cities or towns having ten or more mentally defective children to give these retarded pupils suitable training and education in special school classes.

This is a flank movement for the benefit of the feeble-minded of the State. In a few years all such people will be recognized,

for all children come under the control of school authorities between the ages of six and fourteen. This will eventually mean that every feeble-minded child may receive proper education, habit training and industrial training during the formative period of youth. The idiots and imbeciles not cared for at home, and the highly potential hereditary defectives with sex tendencies, and those with criminal tendencies, will gradually be drafted into the institutions. We know now that some mental defectives are inherently bad and vicious, and that others are tractable and may be made industrious and harmless. We no longer believe that all mentally defective persons need to be permanently confined in an institution.

The army tests revealed thousands of technically mentally defective drafted men whose mental defect had not prevented self-support and practically blameless lives. Much of the rough and disagreeable manual labor of the mines and fields and forests is performed by persons who could not pass the modern intelligence tests. The lack of 100 per cent efficiency alone does not call for institutional care, or for the taking away of the "right to liberty and the pursuit of happiness."

THE EFFECTS OF SYPHILIS ON THE FAMILIES OF SYPHILITICS SEEN IN THE LATE STAGES.*

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Syphilis is well recognized as an infectious disease. Those in closest contact with a syphilitic in an infectious stage run the greatest chance of acquiring the disease. The likelihood of infection in marriage is thus apparent. The mate of a syphilitic is not only liable to acquire syphilis but the children of the union are apt to be tainted. Thus, the problem of syphilis of the second generation arises. The layman as well as the physician is aware that the family of the syphilitic is a fertile field for the discovery of more syphilis. However, the attention of most clinics is focused on early syphilis. In some progressive syphilitic clinics it is a routine to examine the families of all early syphilitic cases.† In most clinics, however, the families are only examined when there seems to be some special indication for it, such as that the patient acquired syphilis within a short period, that he appears in an infectious stage, that he has recently been married, or that there is a history of possible infection of a mate or child. One of the reasons many of the families are not examined is because of the fact that the probability of familial infection diminishes with the length of the interval between marriage and the original infection. Thus, only too often, the families of patients who acquired syphilis a considerable time before marriage are overlooked on the assumption that the marriage occurred after the period of infectivity had passed. This may be true in a large percentage of cases, but unless there is a

* The compilation of this material was made possible by a grant from the United States Inter-departmental Social Hygiene Board. Reprinted from *Social Hygiene*, Vol. VI, No. 4, October, 1920.

† Unfortunately there are still many clinics in which nothing is done to bring members of the patient's family to the clinic for examination, as is shown by the report of Corwin on the venereal disease clinics of New York City. "Venereal Disease Clinics," E. H. Lewinski-Corwin, *Social Hygiene*, Vol. VI, No. 3, July, 1920.

routine examination there is a decided margin of error. Numerous cases of familial syphilis will be missed. When a marriage takes place late after the infection, if the husband was the person originally infected, the family may be free from syphilis, while if the mother acquired the original infection, she is more likely to bear syphilitic children.

In many cases of syphilis, the patient has been well for such a long time that the families are overlooked. This is partially due to the fact that the patient suffering from a syphilitic complication may appear at a neurological or heart clinic in which syphilis is naturally not the primary interest of the clinic. As the majority of these patients come to the clinic for treatment many years after the original infection, the tendency to neglect the family is marked. Yet it is extremely difficult to determine when the original infection occurred. The patient may not know or may not care to tell the date of infection. Consequently, one is not able in most cases to state just how long after the original infection a marriage took place. It is thus necessary from a practical, therapeutic standpoint to examine as a routine matter the family of the early and late syphilitic.

It is also of interest from a theoretical standpoint that such examinations should be largely routine. Unless this is done, any study of figures is apt to show a selection. If a clinic examines only cases in which there is a probability of familial infection, the percentage of infection is not likely to be accurate.

During the past five years, it has been a routine procedure at the Psychopathic Hospital, Boston, to examine the families of all patients with a positive Wassermann reaction. As this clinic does not deal primarily with syphilitics, but with involvement of the central nervous system, it follows that the cases are almost entirely late syphilitics. During this period of five years, we have succeeded in securing fairly complete examinations of the families of 555 late syphilitics.* It is to be emphasized that practically all the patients were in a late stage of syphilis. In the majority of instances it was not possible to obtain a definite history of the infection, and hence the relation of the infection to marriage could not be determined. These examinations were made as a matter of routine, and therefore represent fairly accurately the

* Two previous papers, "The Family of the Neurosyphilitic," *Mental Hygiene*, Vol. II, No. 1, January, 1918, and "Social Work and Neurosyphilis," *Social Hygiene*, Vol. VI, No. 1, January, 1920, dealt with a similar group of families. There is at times a slight variation in the figures of the present paper from those given in the previous papers due to a different method of calculation and to a larger number of families in the later survey.

condition that would be found in any clinic dealing with late syphilitics. The diagnosis of syphilis was made largely upon the Wassermann findings. This was done because it is recognized that the Wassermann reaction is a definite standard, irrespective of the number of cases which may escape detection. It may be stated that the reaction is fairly constant, and hence offers a better means for obtaining figures on familial syphilis than the physical examination, which is so open to personal interpretation. As is true with all studies in which the Wassermann reaction is taken as the standard of the incidence of syphilis, these figures are probably somewhat lower than the actual incidence of syphilis in this group. However, it probably offers a greater degree of accuracy than would be true if the diagnoses were made upon the physical examination, which would cause a variation dependent upon the ideas of the individual examiner.

The percentage of living non-syphilitic children* is considerably greater in our study than in the studies of many other investigators. This is doubtless due to an unconscious selection in other studies. Thus one finds a low percentage of non-syphilitic children in groups in which a "syphilitic family" is one in which the original patient was a congenital syphilitic or a syphilitic mother. One would naturally expect to find more congenital syphilis in these families than when the original patient is a male who may not have infected his wife. One congenital syphilitic suggests the possibility of a second; the known syphilitic mother is apt to have syphilitic children.

It has been our endeavor to present an unselected group. The families of known syphilitic children have not been included, on the ground that they might unduly increase the Wassermann percentages. All married admissions to the Psychopathic Hospital with a positive Wassermann reaction, whether male or female, whose families could be examined are included in the 555 families. It was not possible, however, to include every member in all the families. This is due to a variety of reasons. In some instances, individuals desired for examination had left the vicinity, could not be located, or refused to make the trip to the hospital. On 191 of these 555 families it was possible to get examinations of all members, leaving 364 families in which not every member was examined. The question then arises as to the accuracy of the figures in one or the other group. A perusal of the tables indicates that there is some variation under the

* Stepchildren are not included in this study.

headings in the group where all members were examined (191) from that in which not all were examined (364).

Unintentionally a selection takes place in a study carried out as this has been, although all efforts are made to prevent the cases from being selected, but it does follow that the 191 families in which all members were examined differ somewhat from the 364 families in which only certain members were examined. This may be explained as follows: in the families consisting of only man and wife the spouse would probably come to the hospital to visit the original patient. An examination could be made at this time and thus all members of the family would be examined. This is very much easier than to bring in half a dozen individuals who would not ordinarily visit the hospital. Hence, the group consisting of the 191 families completely examined is likely to contain many instances of small families and to have a higher percentage of sterility than the group of 364 families. Another point which leads to selection is that when one child is found to show evidence of syphilis, much more effort is made, unintentionally or not, to secure the remaining children than would be the case when all those who had been examined were found to be negative. We believe that these two factors, smallness of the family and the presence of syphilis in children already examined, would lead to a definite selection producing the 191 families.

The data on sterility, accidents to pregnancies, birth rate, and number of living children is obtained by history. Hence, the figures dealing with these matters will be given correctly in the total group of families (555), which is a random group entirely unselected. This is not the case in the tables dealing with the Wassermann examinations of the individuals. If not all members are examined, it may happen that those who escaped examination may show a greater or less percentage of infection than those examined, and thus the figures obtained would not be accurate. Nor can the percentages obtained in the study of the completely examined families (191) be considered an absolute index, because of the possible selection of this group. The correct figures probably lie between those obtained for the families completely examined and those not completely examined.

An effort has been made to check up any further inaccuracies that might arise from the nature of the material. The correctness of the figures on pregnancies and the Wassermann reaction on children might be questioned on the ground that we do not know whether the families with no children will later bear

children, or if the number of accidents to pregnancies or incidence of syphilitic children will increase with length of marriage.

To settle these points we have investigated the ages of the mothers and the length of marriages. If our mothers were very young or married only a short time, there would be a strong possibility of more pregnancies. An examination of the number of years of marriage shows that in 139 of the 191 families who gave this information, the average years married was 11.09 and the median 10. In this group are included only 4 cases in which the marriage was very short. The average and median ages of the mothers was thirty-seven years. This is, of course, not the end of the childbearing period. A study of non-syphilitic families¹ shows that for the age group 30 to 39, there were 5.4 live-born children, while for the group 40 and over, there were 7.7 live-born children. Our group in which the average age of the women is thirty-seven is very nearly comparable to the 30 to 39 group. Thus, if our group could still bear children and if the rise in birth rate with the age of the mother were equal to that of the non-syphilitic families, our birth rate would change from 2 to 2.99. That the length of marriage and the age of the woman do not affect our group of families is shown by a comparison we have made of 118 of the families, in which there was no chance of further pregnancy, either because of the death of one parent, divorce, or commitment to an insane hospital with no chance of recovery. The difference in percentage is so slight that we feel the indication is to consider our families as families in which there would be no further pregnancies.

It has also been shown that economic conditions tend to increase infant mortality in non-syphilitic families. If our families were all of the lowest class, we could hardly point to syphilis as the chief cause of interrupted pregnancies and infant deaths. The largest infant mortality rate in the non-syphilitic families¹ was in those families in which the annual earnings of the father were under \$625, while the smallest rate was in the families with an income of \$900 or more. Seventy-two per cent of a small group of 41 of our paretics who were visited for exact information on income had an annual income of \$900 or over. This indicates that our families are not on the poverty line and that economic status does not greatly influence the percentages.

A rough examination of the occupations of about 200 of the cases shows that the middle-class or trade group is largely repre-

sented, while the poorest and richest groups are comparatively few. This merely reinforces the point that our patients are not of the lowest economic status.

The criticism might be made in connection with the statistics on the Wassermann reaction that not all individuals were examined. In the 191 families, all individuals (381) were examined. In the 364 families, 377 (36 per cent) of 1,029 individuals were examined; thus 758 (53.8 per cent) of the total individuals (1,410) were examined. This is considered a sufficiently large number to warrant the conclusions. The patients whose families were examined may further be divided into three groups: —

Group 1. — Patients with a diagnosis of general paresis.

Group 2. — Those with a diagnosis of cerebrospinal syphilis.

Group 3. — Those having a diagnosis of syphilis without involvement of the central nervous system.

This division is made because of the older ideas concerning parasyphilis and cases with involvement of the central nervous system, as differentiated from visceral syphilis. Numerous articles have been written in the past to show that the offspring of general paretics were remarkably healthy and quite devoid of familial syphilis. Parallel studies indicated the contrary. It is also quite well established that the cases which develop general paresis are likely to be fairly free from skin and mucous-membrane lesions. Hence, it might be argued that they are relatively less likely to infect the families than the patients with no nervous system involvement who are more prone to dermatological manifestations. Another reason for this separation is to emphasize the fact to those who deal largely with cases of paresis — namely, the physicians in institutions for the care of the insane — that the general paretic's family is the family of a syphilitic. We feel that in the past this idea has not been definitely before the State hospital physician, or, for that matter, in the mind of the general practitioner.

Having discussed the general implications of the study, we can now turn to a study of the tables.

Group I includes five tables dealing with the family as a unit. Table I shows the number of families in which some member aside from the original patient had a positive Wassermann reaction. Of the 191 families in which all members were examined, a positive Wassermann reaction occurred in 30 per cent, whereas in the 364 families, it occurred in but about 19 per cent. As has been said above, a selection took place which would

account for the difference in the number of families in which a positive Wassermann reaction occurred. It follows, however, that necessarily somewhere between 19 per cent and 30 per cent would be the correct figure if every member of the original group of 555 families had been examined; that is, it would undoubtedly be higher than 19 per cent and less than 30 per cent. Taking the larger group (555), a positive Wassermann reaction occurred in 22.8 per cent of the families, which is probably close to the correct figure, had all members been examined. This figure of 22.8 per cent, representing the number of families in which a positive Wassermann reaction was found, is typical of what may be expected in any clinic dealing with late syphilitics where an effort is made to bring the spouse and children of syphilitic patients to the clinic for examination.

Table II is concerned with the percentage of families in which no living children were born. The families in which no successful pregnancies occurred may be divided into families which were entirely sterile, and those in which pregnancies occurred which never came to successful fruition. The tables dealing with the total 555 families may be considered as giving the correct percentage for this study, which is based upon history. It was found that 29.7 per cent of the families did not give birth to living children, 23 per cent being entirely sterile, and 6.7 per cent having unsuccessful pregnancies. It must be borne in mind that we are not here dealing with the question of accidents to pregnancies as such, but merely with the number of childless families. Not all of the sterility and childless marriages can be definitely traced to syphilis. Gonorrhœa, pelvic deformities, mismating, and the like may account for some of the sterility. However, if we compare this figure of 29.7 per cent, as showing the number of childless families in our group, with that which is found in a general survey,* it is clear that the figures obtained from a group of syphilitic families is very much higher. An analysis of native white Rhode Island women, forty-five years of age, who had been married from ten to nineteen years, shows that 17.5 per cent were childless. Including the foreign-born women, 11.3 per cent are childless. This latter group is comparable to the patients at our clinic who represent the same races as the group on which the census report quoted is based.² A comparison of these figures (29.7 per cent and 11.3 per cent) leaves no doubt

* It must be remembered that all general surveys include a certain percentage (approximately 10 per cent) of syphilitic individuals; hence the contrast between our figures and those of a non-syphilitic group is greater than is apparent.

that syphilis is a very large factor in the production of sterility and childlessness. It must be remembered that in this discussion we are dealing with the family of the late syphilitic. These figures are not entirely comparable with others that have been quoted, which are often obtained in a gynecological or obstetrical clinic where only families of patients with evidence of syphilis are considered or where other methods of selection are used. Figures given in the literature as to the amount of sterility occurring in syphilitic families vary from 4.1³ to 75 per cent,⁴ with many intermediate percentages, as 45.7 per cent⁴ (Huebner, quoted by Haskell, *loc. cit.*).

In Table III we deal with the birth rate and average number of living children per family. Here, again, this information is obtained from history, and therefore the percentages of the 555 families can be considered. Of these 555 families, 352 families, or 63.4 per cent, had living children. The average birth rate per family was 2.05, and the average number of living children per family at the time of the investigation was 1.62. For purposes of comparison, we give an average birth rate of 3.8 for Rhode Island, taken from the United States census report (*loc. cit.*), as typical for New England, which is almost twice that found in our group of syphilitic families. In other words, the number of children born in this group of families is practically one-half of that found in the same type of population taken at random. It is thus obvious that syphilis plays a large part in the matter of race suicide. Louis Dublin states that it requires an average of nearly four children per family to make a new generation as large as the old.⁵ The average of 2.05 births per family in our group of syphilitic families means a loss in population.

Table IV shows the number of families with defects as to children and syphilis in the spouse, as shown by the Wassermann reaction. This table illustrates how few families among the syphilitic group are free from some defect or other which can be traced to syphilis. It is true that in some instances the defect, which may be sterility or a miscarriage, may not be due to syphilis, yet it indicates the importance of considering the family in every case of syphilis. The compilation shows that only 44.5 per cent of these families had no defects as to children, meaning by that that there was no sterility, abortions, miscarriages, stillbirths, or syphilitic children. If dead children had been considered a defect, the percentages of families free of defect as to children would be even lower. It is fair to assume that in

some instances early pregnancies resulted in syphilitic children who died young. As we had no definite way of showing this, we have left it out of consideration entirely and assumed that the dead children were not syphilitic. Only 30.3 per cent of all the families were free from defect as to children and syphilis in the spouse. In other words, less than one-third of our entire group of 555 families should be considered as definitely free from syphilis or defect possibly due to syphilis.

The number of families with accidents to pregnancies is shown in Table V. Of the 555 families, only 427 had any pregnancies. Of these 427 families, abortions, miscarriages or stillbirths occurred in 156 families, or 36.5 per cent. This means that more than one-third of the women who became pregnant had abortions, miscarriages or stillbirths.

The results of the Wassermann survey on the individuals is given in the three tables of Group II. The incidence of the positive Wassermann reaction is shown to vary between 17.8 per cent (191 families) and 22.3 per cent (364 families). Seven hundred and fifty-eight individuals in all were examined. Of these, 20.1 per cent gave a positive Wassermann reaction, whereas 2.1 per cent gave a doubtful reaction. This would seem to represent fairly accurately for general purposes, in a routine series of mates and children of the late syphilitic patient, the number of individuals who will give a positive or doubtful Wassermann reaction.

Reference to Tables II and III shows what we might expect *a priori*, namely, that a positive Wassermann reaction would be found to have a higher percentage incidence in the mate than in the children. In other words, in most families in which a child is infected, it is probable that both parents are infected, but in any given family in which one child is infected, it does not follow that all the brothers and sisters will be infected. Practically 30 per cent of the spouses gave a positive Wassermann reaction, whereas the number of children who gave a positive Wassermann reaction was somewhere between 8.4 per cent (191 families) and 16.7 per cent (364 families), according to the method of selection. It is difficult to say just what percentage of the total number of children would have given a positive Wassermann reaction had they all been examined, but it could not be less than 8.4 per cent, and would probably be considerably greater.

There are no very accurate figures in existence as to the prevalence of congenital syphilis in the community at large, but we have no hesitancy in definitely stating that it is not nearly as

large as 8 per cent. It should be remembered that this figure is based upon the positive Wassermann reaction, so that there can be no doubt that it is a minimum figure for the prevalence of congenital syphilis in these families. A review of the literature concerning the prevalence of congenital syphilis in syphilitic families shows figures varying greatly from those which we have to offer. All reports that we have found ranged very much higher than ours, but, as stated above, this variation is undoubtedly due to a different method of selection of syphilitic families. Post,⁶ in a survey of 30 families based upon his clinical judgment, gives the incidence of syphilis in the living children of these families as 45.1 per cent. Hochsinger,⁷ in a similar survey of 134 families, gives the incidence of congenital syphilis as 83.2 per cent. Plaut and Göring,⁸ in a Wassermann survey of 54 families, placed the incidence of positive reactions at 26 per cent. Of these reports, only that of Plaut and Göring was made at all similarly to ours, that is, by a Wassermann survey, and their percentage runs considerably higher than ours. Of course they studied a much smaller group, and it is not certain that the examinations were routine or made on unselected families. It is desirable to make perfectly clear that our figures are based on the examination of the children of families in which one parent was known to have syphilis. In many instances this was the father, and the mother was not infected as far as known. The figures which we offer, we believe, give an accurate account of the results of a Wassermann survey made in this fashion.

Many of the studies reported in the literature use the term "syphilitic family" without defining the method of selection. If families are selected in which the mother is known to be syphilitic, the results are quite different from those obtained from all families in which either the mother or father is syphilitic. Thus, in our group of 555 families, there were 236 women known to be syphilitic. A study of the families of these 236 syphilitic women gives somewhat different results from those based upon the study of 555 families including families in which the mother was not syphilitic and only the father showed signs of syphilis. Thus, in the 236 families with syphilitic mothers, 95, or 40.2 per cent, were childless, as compared with 29.7 per cent of childless marriages in the entire 555 families. The amount of actual sterility did not vary greatly, as there were found to be 24.5 per cent of sterile families among the 236 mothers who were syphilitic, as compared with 23 per cent in the total group (555). On the other hand, 15.7 per cent of the syphilitic women had

abortions, miscarriages, or stillbirths, and no children born alive, as compared to 6.7 per cent of the larger group (555). The birth rate and average number of living children per family was smaller in the group composed of syphilitic mothers, the birth rate being 1.84 and the average living children per family 1.33. In the larger group (555) the birth rate was 2.05 and the average number of living children per family 1.62. The largest discrepancy between the figures obtained by this different method of selection is shown in the number of children with positive Wassermann reactions. One hundred and forty-two children born in this group of 236 families were examined, and 39, or 27.5 per cent, gave a positive Wasserman reaction. This figure is to be compared with 12.8 per cent, which is the percentage of positive Wassermann reactions occurring in the children examined in the total group of families (555). The comparison is given in tabular form:—

| | 236 FAMILIES IN WHICH THE MOTHER GAVE A POSITIVE WASSERMANN REACTION. | | TOTAL GROUP OF 555 FAMILIES IN WHICH ONE OR BOTH PARENTS GAVE A POSITIVE WASSERMANN REACTION (INCLUDES GROUP OF 236 FAMILIES). | |
|---|---|-----------|--|-----------|
| | Number. | Per Cent. | Number. | Per Cent. |
| Families with positive Wassermann reaction in children | 23 | 9.7 | 36 | 6.5 |
| Families with no pregnancies | 58 | 24.5 | 128 | 23.0 |
| Families with no children, but with abortions, miscarriages and stillbirths | 37 | 15.7 | 37 | 6.7 |
| Families with no children | 95 | 40.2 | 165 | 29.7 |
| Families in which abortions, miscarriages and stillbirths occurred | 93 | 52.2 | 156 | 36.5 |
| Birth rate | 1.84 | — | 2.05 | — |
| Average number of living children per family | 1.33 | — | 1.62 | — |
| Total pregnancies | 632 | 100.0 | 1,432 | 100.0 |
| Abortions to pregnancies | 198 | 31.3 | 297 | 20.7 |
| Average number of pregnancies per family | 2.68 | — | 2.58 | — |
| Children examined | 142 | 100.0 | 423 | 100.0 |
| Children positive | 39 | 27.5 | 54 | 12.8 |

The question may be raised whether it is worth while from a practical standpoint to examine children of those families in which the mother has a negative Wassermann reaction. There are many who hold that congenital syphilis does not arise through paternal syphilis alone, that is, if the mother did not acquire syphilis, the children would be free from the disease. On this basis, an examination of the children for evidence of syphilis would not be demanded. We do not intend to go into this theoretical discussion at the present time. From a practical standpoint, however, we believe that it is worth while and im-

portant to make an examination of the children in a family in which the father is syphilitic, although it may not be possible to show the evidence of syphilis in the mother. This statement is made upon the basis of an examination of our material. Starting with the group of syphilitic children, it was found that of the mothers of these children, 17.2 per cent have a negative Wassermann reaction and give no symptomatic evidence of syphilis. Stated another way, nearly one-fifth of the mothers whose children were syphilitic show no evidence of syphilis themselves, either serologically or upon clinical examination. This finding need not be taken as bearing on the question of paternal transmission, as it is possible that the mothers may have been in the state of latent syphilis, and the negative Wassermann reaction was either the result of a spontaneous change of the blood serum which had previously been positive, or due to a technical error in the performance of the test. Our point is that it is worth while to examine the children of syphilitic fathers, even though the mother may not show evidence of syphilis.

It is to be presumed that there were more syphilitic children born in these families than our survey indicates. The general opinion is that syphilis is a frequent cause of infant deaths. It is probable that many of the children who had died before our examination was made were syphilitic. However, our figures for deaths are no greater than those found in non-syphilitic families. A review of our statistics shows that at the time of examination, approximately 20 per cent of the children who had been born alive had died. This agrees almost exactly with the figures given by the United States Life Table for 1910,* which shows that 20 per cent of the children born into the world do not reach the age of eighteen. We were able to obtain the age of death of 44 children in our group. Of these, all but one died under the age of eighteen, and this one died at the age of nineteen, so that it may be stated that these figures are absolutely comparable. Considered from the standpoint of infant mortality, it is found that the infant mortality of the group born in our syphilitic families is less than the infant mortality rate as given in the Massachusetts Census for 1910 and the Johnstown Survey of the Children's Bureau for 1915, which gave the infant mortality rate as 131 and 134 per thousand, respectively. The infant mortality rate in our group was 124 per thousand. These figures are of considerable interest as showing that the infant

* Bureau of the Census, Department of Commerce. Washington, Government Printing Office, 1916.

mortality rate and the deaths of children under eighteen years of age do not vary greatly in the families of the late syphilitic as seen in the clinic from the mortality as found in the community. In other words, it would seem that syphilis does not play a very large rôle in the production of infant mortality or early deaths in the children born in the families of our late syphilitics. We make no attempt to discuss why these findings differ so greatly from the general ideas that are held on this matter. We can only emphasize that our result is obtained by a careful survey of the facts.

Table I of Group III presents the number of abortions, miscarriages and stillbirths, compared to the total number of pregnancies. In the entire group (555 families) there were 1,432 pregnancies. Two hundred and ninety-seven, or 20.7 per cent, of these pregnancies resulted in abortions, miscarriages or stillbirths. Of course, all the accidents to pregnancies in these families were not due to syphilis, and we know that these accidents occur not infrequently in non-syphilitic families. Jeans,⁹ in an analysis of 200 families showing no obvious signs of syphilis, found accidents to pregnancies occurring in 9.7 per cent of a total of 886 pregnancies. Harmon¹⁰ states that in 154 poor families, exclusive of any known cases of syphilis, there were 826 pregnancies, with 78, or 9.4 per cent, resulting in a failure to produce a living child. In the Johnstown study,¹ 1,491 married mothers had a total of 5,808 pregnancies, which were unsuccessful in 7.7 per cent of the cases. This seems to indicate rather definitely that accidents to pregnancies are about twice as frequent in the known syphilitic families as in those which are considered in a routine procedure. The average number of pregnancies per family in our group of 555 families was 2.58, which is distinctly lower than that given in the studies just mentioned. The average number of pregnancies per family in the study made by Jeans was 4.43; in that of Harmon, 5.51; and in the Johnstown study, 3.88.

Table II presents the ratio of stillbirths to live births. There were 40 stillbirths as compared with 1,135 live births, giving a ratio of 3.52 stillbirths to 100 live births. This ratio does not differ greatly from that obtained in community surveys. Thus, the average number of stillbirths per 100 live births for Boston, Mass., in the years 1891-1919, inclusive, is 3.79. The figure given by Dempsey¹¹ for Brockton, Mass., is 3 stillbirths per 100 live births; for Johnstown, Pa., 4.5; for Manchester, N. H., 4.8; for Saginaw, Mich., 3.3; for New Bedford, Mass., 2.8, and

the average for these five cities is 3.8. In other words, it would seem that there was no particular difference in the stillbirth ratio in the 555 syphilitic families from that found in the general community. We may therefore conclude that whereas the incidence of abortions and miscarriages is very much higher in our syphilitic group than in the general unselected groups of families, the incidence of stillbirths is approximately the same in both groups.

In the discussion which has preceded, no consideration has been given to differences occurring in the three divisions of the syphilitic cases which we have offered, namely, general paresis, cerebrospinal syphilis, and syphilitic cases in which the central nervous system was not involved. This comparison is given in the table of Group IV, which indicates that there is a slight difference in the amount of difficulties that may be found in the three groups. The number of cerebrospinal syphilitics occurring in the group where all were examined (191) is so small that this group is not valuable for this particular aspect of the study. Considering the other two groups (364 and 555), there are a few facts which stand out.

There is no one of these three types of syphilis that does not produce its effect upon the family. There is some difference in the percentage figures given under the three groups. In a general way the Wassermann survey shows a smaller number of positive Wassermann reactions in the mates and children of the patients who had cerebrospinal syphilis, while, on the other hand, there are more families in this group in which accidents to pregnancies occurred. There is very little difference in the percentages obtained in the families of patients who had general paresis and those without involvement of the nervous system. The variation that does occur is apparently within the ordinary limits of variation of a finite group. It may therefore be stated that in a general way the effect of syphilis upon the mates and offspring of persons suffering from syphilis of the nervous system and those suffering from syphilis which does not involve the nervous system is not sufficient to be of any great importance; the same type of difficulties occurs with a frequency that does not greatly vary. The problems of syphilis from the familial standpoint are practically the same whatever course the syphilis takes in the individual patient.

SUMMARY.

The families of syphilitic patients admitted to the Psychopathic Hospital have been examined as a routine procedure. The patients are all in the late stage of the disease and are

divided into three groups: (1) general paresis, (2) cerebrospinal syphilis, and (3) late syphilis without involvement of the nervous system. This division is made to determine if the familial problem is different in cases of central nervous system involvement from those in which the central nervous system escapes. The families of 555 syphilitic patients were examined and the following findings were obtained:—

1. The family of the late syphilitic abounds with evidence of syphilitic damage.

2. At least one-fifth of the families of syphilitics have one or more syphilitic members in addition to the original patient.

3. Between one-third and one-fourth of the families of syphilitics have never given birth to a living child. This is much larger than the percentage obtained from the study of a large group of New England families taken at random which shows that only one-tenth were childless.

4. More than one-third of the families of syphilitics have accidents to pregnancies, namely, abortions, miscarriages or stillbirths.

5. The birth rate in syphilitic families is 2.05 per family; whereas the birth rate in the New England families mentioned above is 3.8 per family, or almost twice as great.

6. Two-thirds of the families show defects as to children (sterility, accidents to pregnancies, and syphilitic children).

7. Only one-third of the families show no defect as to children or Wassermann reaction in spouse.

8. About one-fifth of the individuals examined show a positive Wassermann reaction; more of these are spouses than children.

9. Between one-fourth and one-third of the spouses examined show syphilitic involvement.

10. Between one in twelve and one in six of the children examined show syphilitic involvement.

11. One-fifth of all children born alive in syphilitic families were dead at the time the families were examined. This does not differ materially from the general average in the community.

12. One-fifth of the pregnancies are abortions, miscarriages or stillbirths, compared with less than one-tenth of the pregnancies in non-syphilitic families.

13. The average pregnancies per family is 2.58, compared with 3.88, 4.43 and 5.51 in non-syphilitic families.

14. There are 3.52 stillbirths per 100 live births in the syphilitic families, as compared with the 3.79 reported by the Massachusetts census, showing that there is no very marked difference in this regard.

15. A syphilitic is a syphilitic, whether his disease is general paresis, cerebrospinal syphilis or visceral syphilis without involvement of the central nervous system, and the problems affecting his family are the same in any case.

The family of every syphilitic patient should be examined, irrespective of the stage of the disease or the symptomatology presented by the patient when first seen. If this is done, cases of conjugal and congenital syphilis will be discovered which would otherwise be neglected. They will often be found at a period when symptoms are not active, and thus treatment may be instituted before irreparable destructive lesions have occurred. An opportunity is offered to prevent the development of such disabling conditions as general paresis, tabes dorsalis, aneurysms, and the like. The possibility of bearing healthy children may be increased. Every clinic dealing with syphilitic patients, whether it is primarily a syphilitic clinic, a neurological clinic, a cardiac clinic, or an internal medicine clinic should be equipped with the machinery for bringing the members of the syphilitic's family to the clinic for examination.

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TABLE III. — Birth Rate and Average Number of Living Children per Family.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| Total families | 150 | 100.0 | 9 | 100.0 | 32 | 100.0 | 191 | 100.0 | 192 | 100.0 | 48 | 100.0 | 124 | 100.0 | 364 | 100.0 | 342 | 100.0 | 57 | 100.0 | 156 | 100.0 | 555 | 100.0 |
| Families with living children | 75 | 50.0 | 6 | 66.7 | 13 | 40.6 | 94 | 50.0 | 145 | 75.5 | 33 | 68.6 | 80 | 64.5 | 258 | 70.9 | 220 | 64.3 | 39 | 68.4 | 93 | 59.6 | 352 | 63.4 |
| Birth rate per family | 1.33 | | 1.89 | | 1.29 | | 1.35 | | 2.32 | | 2.96 | | 2.34 | | 2.41 | | 1.89 | | 2.79 | | 2.12 | | 2.05 | |
| Average number of living children per family | 1.06 | | 1.44 | | .94 | | 1.06 | | 1.90 | | 2.45 | | 1.75 | | 1.92 | | 1.53 | | 2.28 | | 1.58 | | 1.62 | |

TABLE IV. — Families with Defects as to Children or Wassermann Reaction in Spouse.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----|-------|---|-------|----|-------|-----|-------|-----|-------|----|-------|-----|-------|-----|-------|-----|-------|----|-------|-----|-------|-----|-------|
| Total families | 150 | 100.0 | 9 | 100.0 | 32 | 100.0 | 191 | 100.0 | 192 | 100.0 | 48 | 100.0 | 124 | 100.0 | 364 | 100.0 | 342 | 100.0 | 57 | 100.0 | 156 | 100.0 | 555 | 100.0 |
| Families with no pregnancies | 53 | 35.3 | 1 | 11.1 | 11 | 34.4 | 65 | 34.0 | 34 | 17.7 | 8 | 16.7 | 21 | 16.9 | 63 | 17.3 | 87 | 25.5 | 9 | 15.8 | 32 | 20.5 | 128 | 23.0 |
| Families with no children, but with abortions, miscarriages or stillbirths | 9 | 6.1 | 1 | 11.1 | 6 | 18.8 | 16 | 8.4 | 8 | 4.2 | 4 | 8.3 | 9 | 7.2 | 21 | 5.8 | 17 | 5.0 | 5 | 8.8 | 15 | 9.7 | 37 | 6.7 |
| Families with positive Wassermann reaction in children | 8 | 5.3 | 0 | | 4 | 12.5 | 12 | 6.3 | 15 | 7.8 | 1 | 2.1 | 8 | 6.5 | 24 | 6.6 | 23 | 6.7 | 1 | 1.7 | 12 | 7.7 | 36 | 6.5 |
| Families with non-syphilitic children, but accidents to pregnancies | 24 | 16.0 | 2 | 22.3 | 3 | 9.3 | 29 | 15.2 | 38 | 19.8 | 16 | 33.3 | 24 | 19.4 | 78 | 21.4 | 62 | 18.1 | 18 | 31.6 | 27 | 17.3 | 107 | 19.3 |
| Total families with defects as to children | 94 | 62.7 | 4 | 44.5 | 24 | 75.0 | 122 | 63.9 | 95 | 49.5 | 29 | 60.4 | 62 | 50.0 | 186 | 51.1 | 189 | 55.3 | 33 | 57.9 | 86 | 55.2 | 308 | 55.5 |
| Total families with no defects as to children | 56 | 37.3 | 5 | 55.5 | 8 | 25.0 | 69 | 36.1 | 97 | 50.5 | 19 | 39.6 | 62 | 50.0 | 178 | 48.9 | 153 | 44.7 | 24 | 42.1 | 70 | 44.8 | 247 | 44.5 |
| Total | 150 | 100.0 | 9 | 100.0 | 32 | 100.0 | 191 | 100.0 | 192 | 100.0 | 48 | 100.0 | 124 | 100.0 | 364 | 100.0 | 342 | 100.0 | 57 | 100.0 | 156 | 100.0 | 555 | 100.0 |
| Families with no defect as to children or Wassermann reaction in spouse * | 43 | 28.6 | 3 | 33.3 | 8 | 25.0 | 54 | 28.2 | 64 | 33.3 | 17 | 35.4 | 49 | 39.5 | 130 | 35.7 | 106 | 31.0 | 20 | 35.1 | 57 | 36.5 | 183 | 30.3 |

* These percentages were taken on the total families, although there were a few families in which the children were non-syphilitic as far as known but in which there was no living spouse to examine. The assumption was that the spouse was non-syphilitic.

TABLE V. — Families with Accidents to Pregnancies.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----|-------|---|-------|----|-------|-----|-------|-----|-------|----|-------|-----|-------|-----|-------|-----|-------|----|-------|-----|-------|-----|-------|
| Total families | 150 | 100.0 | 9 | 100.0 | 32 | 100.0 | 191 | 100.0 | 192 | 100.0 | 48 | 100.0 | 124 | 100.0 | 364 | 100.0 | 342 | 100.0 | 57 | 100.0 | 156 | 100.0 | 555 | 100.0 |
| Families with pregnancies | 97 | 64.7 | 8 | 88.9 | 21 | 65.6 | 126 | 66.0 | 158 | 82.3 | 40 | 83.3 | 103 | 83.1 | 301 | 82.7 | 255 | 74.6 | 48 | 84.2 | 124 | 79.5 | 427 | 76.9 |
| Families in which abortions, miscarriages and stillbirths occurred * | 35 | 36.0 | 3 | 37.5 | 12 | 57.1 | 50 | 39.7 | 50 | 31.6 | 19 | 47.5 | 37 | 35.9 | 106 | 35.2 | 85 | 33.3 | 22 | 46.0 | 49 | 39.5 | 156 | 36.5 |

* These percentages were taken on families with pregnancies.

GROUP II. — Three Tables showing Percentage of Syphilis in Spouses and Children by Wassermann Survey.

TABLE I. — The Amount of Syphilis in All Individuals examined.

| Class. | A. 191 FAMILIES IN WHICH EVERY LIVING MEMBER WAS EXAMINED. | | | | | | B. 364 FAMILIES IN WHICH ONE OR MORE MEMBERS BESIDES THE PATIENT WAS EXAMINED. | | | | | | C. 555 FAMILIES, TOTAL OF A AND B. | | | | | | | | | | | | | | |
|--------------------------------------|--|-----------|---------|------------------------------|---------|-----------|--|-----------|---------|------------------|---------|-----------|------------------------------------|-----------|---------|-----------|---------|-----------|------------------|-----------|---------|------------------------------|---------|-----------|---------|-----------|--|
| | GENERAL PARESIS. | | | NERVOUS SYSTEM NOT INVOLVED. | | | TOTAL. | | | GENERAL PARESIS. | | | NERVOUS SYSTEM NOT INVOLVED. | | | TOTAL. | | | GENERAL PARESIS. | | | NERVOUS SYSTEM NOT INVOLVED. | | | TOTAL. | | |
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total individuals examined | 302 | 100.0 | 58 | 100.0 | 381 | 100.0 | 217 | 100.0 | 59 | 100.0 | 101 | 100.0 | 377 | 100.0 | 519 | 100.0 | 80 | 100.0 | 159 | 100.0 | 758 | 100.0 | | | | | |
| Total individuals negative | 249 | 82.5 | 38 | 65.5 | 304 | 79.8 | 161 | 74.2 | 52 | 88.1 | 73 | 72.3 | 286 | 75.9 | 410 | 79.0 | 69 | 86.3 | 111 | 69.8 | 590 | 77.8 | | | | | |
| Total individuals doubtful | 7 | 2.3 | 2 | 3.5 | 9 | 2.4 | 4 | 1.8 | 2 | 3.4 | 1 | 1.0 | 7 | 1.9 | 11 | 2.1 | 2 | 2.5 | 3 | 1.9 | 16 | 2.1 | | | | | |
| Total individuals positive | 46 | 15.2 | 18 | 31.0 | 68 | 17.8 | 52 | 24.0 | 5 | 8.5 | 27 | 26.7 | 84 | 22.3 | 98 | 19.0 | 9 | 11.2 | 45 | 28.3 | 152 | 20.1 | | | | | |

TABLE II. — The Amount of Syphilis in Spouses.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------------|-----|-------|---|-------|----|-------|-----|-------|----|-------|----|-------|----|-------|-----|-------|-----|-------|----|-------|----|-------|-----|-------|
| Total spouses examined | 143 | 100.0 | 8 | 100.0 | 28 | 100.0 | 179 | 100.0 | 96 | 100.0 | 21 | 100.0 | 40 | 100.0 | 157 | 100.0 | 239 | 100.0 | 29 | 100.0 | 68 | 100.0 | 336 | 100.0 |
| Total spouses negative | 105 | 73.4 | 4 | 50.0 | 16 | 57.1 | 125 | 70.0 | 62 | 64.6 | 16 | 76.2 | 28 | 70.0 | 106 | 67.5 | 167 | 70.0 | 20 | 69.0 | 44 | 64.7 | 231 | 68.7 |
| Total spouses doubtful | 2 | 1.4 | 0 | — | 1 | 3.6 | 3 | 1.6 | 2 | 2.1 | 2 | 9.5 | 0 | — | 4 | 2.6 | 4 | 1.6 | 2 | 6.9 | 1 | 1.5 | 7 | 2.1 |
| Total spouses positive | 36 | 25.2 | 4 | 50.0 | 11 | 39.3 | 51 | 28.4 | 32 | 33.3 | 3 | 14.3 | 12 | 30.0 | 47 | 29.9 | 68 | 28.4 | 7 | 24.1 | 23 | 33.8 | 98 | 29.2 |

TABLE III. — The Amount of Syphilis in Children.

| | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|-----|-------|----|-------|----|-------|-----|-------|-----|-------|----|-------|----|-------|-----|-------|-----|-------|----|-------|----|-------|-----|-------|
| Total children examined | 159 | 100.0 | 13 | 100.0 | 30 | 100.0 | 202 | 100.0 | 121 | 100.0 | 39 | 100.0 | 61 | 100.0 | 221 | 100.0 | 280 | 100.0 | 52 | 100.0 | 91 | 100.0 | 423 | 100.0 |
| Total children negative | 144 | 90.6 | 13 | 100.0 | 22 | 73.3 | 179 | 88.6 | 99 | 81.8 | 37 | 94.9 | 45 | 73.8 | 181 | 81.9 | 243 | 86.8 | 50 | 96.0 | 67 | 73.7 | 360 | 85.1 |
| Total children doubtful | 5 | 3.1 | 0 | — | 1 | 3.4 | 6 | 3.0 | 2 | 1.6 | 0 | — | 1 | 1.6 | 3 | 1.4 | 7 | 2.5 | 0 | — | 2 | 2.2 | 9 | 2.1 |
| Total children positive | 10 | 6.3 | 0 | — | 7 | 23.3 | 17 | 8.4 | 20 | 16.6 | 2 | 5.1 | 15 | 24.6 | 37 | 16.7 | 30 | 10.7 | 2 | 4.0 | 22 | 24.1 | 54 | 12.8 |

GROUP III. — *Two Tables showing Accidents to Pregnancies.*

TABLE I.—*Relation of Abortions, Miscarriages and Stillbirths to Pregnancies.*

| CLASS. | A. 191 FAMILIES IN WHICH EVERY LIVING MEMBER WAS EXAMINED. | | | | B. 364 FAMILIES IN WHICH ONE OR MORE MEMBERS BESIDES THE PATIENT WAS EXAMINED. | | | | C. 555 FAMILIES, TOTAL OF A AND B. | | | | | | | | | | | | | |
|--|--|-----------|------------------------------|-----------|--|-----------|------------------|-----------|------------------------------------|-----------|---------|-----------|------------------|-----------|--------------------------|-----------|------------------------------|-----------|---------|-----------|-------|-------|
| | GENERAL PARESIS. | | NERVOUS SYSTEM NOT INVOLVED. | | TOTAL. | | GENERAL PARESIS. | | NERVOUS SYSTEM NOT INVOLVED. | | TOTAL. | | GENERAL PARESIS. | | CEREBRO-SPINAL SYPHILIS. | | NERVOUS SYSTEM NOT INVOLVED. | | TOTAL. | | | |
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | | |
| Total pregnancies | 263 | 100.0 | 56 | 100.0 | 342 | 100.0 | 536 | 100.0 | 185 | 100.0 | 369 | 100.0 | 1,090 | 100.0 | 799 | 100.0 | 208 | 100.0 | 425 | 100.0 | 1,432 | 100.0 |
| Total abortions | 7 | | 1 | | 8 | | 7 | | 0 | | 1 | | 8 | | 14 | | 0 | | 2 | | 16 | |
| Total miscarriages | 50 | 24.0 | 12 | 26.8 | 65 | 24.5 | 69 | 17.0 | 40 | 23.2 | 67 | 21.4 | 176 | 19.5 | 119 | 19.2 | 43 | 23.6 | 79 | 22.0 | 241 | 20.7 |
| Total stillbirths | 6 | | 2 | | 11 | | 15 | | 3 | | 11 | | 29 | | 21 | | 6 | | 13 | | 40 | |
| Average pregnancies per family | 1.76 | - | 1.75 | - | 1.79 | - | 2.79 | - | 3.85 | - | 2.98 | - | 2.99 | - | 2.34 | - | 3.65 | - | 2.72 | - | 2.58 | - |

TABLE II. — *Percentage of Live Births and Stillbirths.*

| Live births | 200 | 100.0 | 17 | 100.0 | 41 | 100.0 | 258 | 100.0 | 445 | 100.0 | 142 | 100.0 | 290 | 100.0 | 877 | 100.0 | 645 | 100.0 | 159 | 100.0 | 331 | 100.0 | 1,135 | 100.0 |
|---|------|-------|-------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|
| Stillbirths | 6 | — | 3 | — | 2 | — | 11 | — | 15 | — | 3 | — | 11 | — | 29 | — | 21 | — | 6 | — | 13 | — | 40 | — |
| Number of stillbirths per 100 live births | 3.00 | — | 17.70 | — | 4.90 | — | 4.26 | — | 3.37 | — | 2.11 | — | 3.79 | — | 3.31 | — | 3.25 | — | 3.80 | — | 4.00 | — | 3.52 | — |

GROUP IV. — *Summary of Families of General Paretics, Cerebrospinal Syphilitics and Syphilitics, Nervous System not involved.*

| Class. | A. 191 FAMILIES IN WHICH EVERY LIVING MEMBER WAS EXAMINED. | | | | B. 364 FAMILIES IN WHICH ONE OR MORE MEMBERS BESIDES THE PATIENT WAS EXAMINED. | | | | C. 555 FAMILIES, TOTAL OF A AND B. | | | |
|--|--|-----------|--------------------------|-----------|--|-----------|------------------|-----------|------------------------------------|-----------|------------------------------|-----------|
| | GENERAL PARESIS. | | CEREBRO-SPINAL SYPHILIS. | | NERVOUS SYSTEM NOT INVOLVED. | | GENERAL PARESIS. | | CEREBRO-SPINAL SYPHILIS. | | NERVOUS SYSTEM NOT INVOLVED. | |
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| | | | | | | | | | | | | |
| Total families with positive Wassermann in one or more members | - | 26.5 | - | 50.0 | - | 42.8 | - | 23.9 | - | 10.6 | - | 15.0 |
| Total families with no children | - | 41.3 | - | 22.2 | - | 53.1 | - | 21.9 | - | 25.0 | - | 24.2 |
| Families with living children | - | 50.0 | - | 66.7 | - | 40.6 | - | 75.5 | - | 68.8 | - | 64.5 |
| Birth rate per family | 1.33 | - | 1.89 | - | 1.29 | - | 2.32 | - | 2.96 | - | 2.34 | - |
| Average living children per family | 1.06 | - | 1.44 | - | .94 | - | 1.90 | - | 2.45 | - | 1.75 | - |
| Families with defects as to children | - | 62.7 | - | 44.5 | - | 75.0 | - | 49.5 | - | 60.4 | - | 50.0 |
| Families with no defects as to children | - | 37.3 | - | 55.5 | - | 25.0 | - | 50.5 | - | 39.6 | - | 50.0 |
| Families with no defects as to children or Wassermann in spouse | - | 28.6 | - | 33.3 | - | 25.0 | - | 33.3 | - | 35.4 | - | 39.5 |
| Families in which abortions, miscarriages and stillbirths occurred | - | 36.0 | - | 37.5 | - | 57.1 | - | 31.6 | - | 47.5 | - | 35.9 |
| Total individuals positive | - | 15.2 | - | 19.0 | - | 31.0 | - | 24.0 | - | 8.5 | - | 26.7 |
| Total spouses positive | - | 25.2 | - | 50.0 | - | 39.3 | - | 33.3 | - | 14.3 | - | 30.0 |
| Total children positive | - | 6.3 | - | - | - | 23.3 | - | 16.6 | - | 5.1 | - | 24.6 |
| Accidents to pregnancies | - | 24.0 | - | 26.0 | - | 26.8 | - | 17.0 | - | 23.2 | - | 21.4 |
| Average pregnancies per family | 1.76 | - | 2.55 | - | 1.75 | - | 2.79 | - | 3.85 | - | 2.98 | - |
| Number stillbirths per 100 live births | 3.00 | - | 17.7 | - | 4.90 | - | 3.37 | - | 2.11 | - | 3.79 | - |

MENTAL RESPONSIBILITY AND PETTY CRIME.*

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During the past few years a great interest has been manifested in the mental makeup of the criminal, and to a large extent he has been relieved from the burden of responsibility on the grounds of mental deficiency and insanity. Notwithstanding the fact that a great justice has been dealt to a large group of these mentally unstable individuals who have, by virtue of their limited or perverted mental activities, fallen into the hands of the law, there has arisen a certain amount of confusion which clouds the issue between mental deficiency and crime. It has, however, prevented a more intensive study of the personality of the so-called criminal, thus limiting our knowledge of the individual to his capacity for carrying out certain prescribed tests, which, at the best, are only an imperfect method of attaining a measurement of one aspect of mental life, namely, intelligence.

Dr. Walter E. Fernald, in his "After Care Study of the Patients discharged from Waverley for a Period of Twenty-five Years," has given us some very valuable information regarding the criminalistic tendencies of a rather large group of mentally defective individuals who have come under his observation. The conservatism of Dr. Fernald, and his belief in segregation, is shown by the fact that during the twenty-five year period only 1,537 inmates were discharged and of this number, 612 were sent directly to institutions for the insane, feeble-minded or epileptic, or were deported to other States. Of the remaining number, histories were obtainable in 646 cases, — 470 males and 176 females. The summing up of the male cases is as follows: —

| | |
|---|----|
| Earning a living without supervision | 28 |
| Working for wages, supervised at home | 86 |
| Working at home, no wages | 77 |
| Living at home, not able to work | 59 |
| Arrested, but not sentenced | 23 |

* Read in abstract before New England Society of Psychiatry.

| | |
|---|-----|
| Sentenced to penal institutions | 32 |
| Committed to other institutions | 43 |
| Readmitted to Waverley | 68 |
| Died | 54 |
| <hr/> | |
| Total | 470 |

I think the important point regarding the criminal defective is that we must not satisfy ourselves by determining only his mental age and intelligence quotient, but make an effort to determine what other factor or factors in the personality of this individual of limited intellect there are that make for his criminal tendencies, and to consider at least whether or not this same individual, with normal intellect, might not still have been criminally inclined.

The mentally defective may, it is true, be lacking in the normal inhibitions to a certain degree, yet be sufficiently endowed with the necessary restraint to permit him to adapt himself to society in the proper environment. But impose upon this same individual the burden of a bad environment and he is wrecked upon one of its many shoals, just as many others of a higher intellect are wrecked, only with the defective it occurs a little earlier.

We can now turn our attention to the criminal and perhaps get a clearer and more comprehensive idea of his personality makeup than the simple statement regarding his mental age permits us. Most of the information gathered to date regarding the mental responsibility of the criminal has been interpreted in terms of the psychometric tests rather than in terms of the effort on the part of the individual to adapt himself to society. A large part of the material has been selected from courts and institutions which have to do with adults, the group to which psychometric tests are least adaptable. Thus we find in the following table the percentage of defectives in institutions range from 28 to 82 per cent right here in Massachusetts. If these same figures were presented as representing the positive Wassermanns, for instance, I am sure that some one would question technique on the basis of the discrepancies. The following is a list published by Goddard:—

| INSTITUTION. | Per Cent Defective. |
|--|------------------------|
| St. Cloud, Minn., Reformatory | 54 |
| Rahway Reformatory, N. J. (Binet)* | 46 |
| Bedford Reformatory, New York (under eleven years) | 80 |
| Lancaster, Mass. (girls' reformatory) | 82 |
| Lyman School for Boys, Westborough, Mass. | 28 |
| Pentonville, Ill., Juveniles | 40 |
| Massachusetts Reformatory, Concord | 52 |
| Newark, N. J., Juvenile Court | 66 |
| Elmira Reformatory | 70 |
| Geneva, Ill. (Binet) | 89 |
| Ohio Boys' School (Binet) | 70 |
| Ohio Girls' School (Binet) | 70 |
| Virginia, three reformatories (Binet). | 79 |
| New Jersey State Home for Girls | 75 |
| Glen Mills School, Pa., girls' department, about | 72 |

Important and interesting as the above figures may be, they neglect other aspects of the human mind than intelligence, such as the volitional and the emotional. Bernard Gluck, in a study of the criminals at the Sing Sing Prison, New York, presented in a most graphic way the "Etiological Factors of Maladjustment" and their relation to different epochs in the individual's life. He states: —

The truth is, that rarely is it possible to hold a single etiologic factor responsible for a criminal act. On the contrary, in the vast majority of instances, a criminal act must be attributed to a number of antecedent interrelated causative factors, each one contributing its share toward the ultimate result, which is expressed in an antisocial act.

Gluck represents graphically various etiological factors which account for maladjustment in their relation to the various epochs in the individual's life. For example, during his first five years of life, birth injuries, malnutrition and hereditary factors, such as alcohol, syphilis and neurotic tendencies, from parents are most likely to become manifest. Between the ages of five and ten, he considers bad home and school training, chorea, mental defects, maldevelopment, etc., likely to become evident. Later on in life, between fifteen and twenty-five, syphilis, sex excesses, deleterious occupations, hysteria phenomena, dementia præcox, and manic-depressive insanity are conditions to be considered. Later in life, between thirty and forty, he suggests that unfortu-

* Tested by Binet scale.

nate sex or marital relations, syphilitic and alcoholic psychoses, severe disappointments, and a lack of a satisfactory place in life, with paranoid trends are commonly seen. Between forty and sixty, he terms the period of renunciation, and here we may expect to find many of the phenomena which are associated with this period of life. From sixty on, the devolutional changes, states of depression, arteriosclerosis, dependency, etc., are commonly seen, and, as previously stated, it is usually a combination of two or more of these factors that initiate the maladjustment which brings the individual into conflict with society.

In a recent study of a group of men numbering 133, confined at the House of Correction at Deer Island, I was impressed with what appeared to me to be the normal intelligence of the vast majority of the men whom I examined. It is true that psychometric tests were not applied to any of the cases, but taking into consideration their family histories, evidence of physical stigmata, developmental history, economic efficiency, school record and intellectual achievements as judged by their knowledge of the current events of the day and retention of school knowledge, I found only 13 per cent who I was satisfied would fall below the standard of the average individual's intellectual capacity. The remaining 87 per cent, to my mind, were individuals quite capable of determining the rightness or wrongness of their acts, who, largely by virtue of their early environment, developed character traits that became woven in the fabric of their personality in such a way and at such a time that it became tortuous and twisted, and ill adapted to meet the demands of any environment that was not either criminalistic or psychopathic. Envy, jealousy, suspicion, hatred, pride (pseudo), self-consciousness, egotism, feelings of inferiority, and even ambition, may all lead to mental conflicts of which antisocial acts are the result. But it is important to remember that between the fundamental character twist and the antisocial act there may be what appears only an indirect relation, or none at all. Yet, in other cases, the idea or state of mind and act are so closely related that the relation between the cause and effect cannot be doubted.

In 17 drug cases seen at Deer Island, that fell in this category in the medical diagnosis, 13 were sentenced for larceny. The object of larceny, in every case, was to procure money to buy drugs. The drug habit, in practically all the cases, was started before twenty. An inquiry regarding the cause of taking the

drugs usually revealed it was part of the sport of the gang. In one case curiosity was the motive for the first "pipe" in a lad who never associated with the gang. In another case morphine was used to check convulsions, and still another, to allay pain. Regardless of how imperfectly these statements fit the actual situation, one fact remains, that these seventeen men had entered upon a criminal career through a door which might well have been closed, and that there is as little use to sentence these men to three or six months in a house of correction as it would to sentence a case of diphtheria to ten days in a hospital. The criterion for release should be cure. The same is true of 31 chronic alcoholics, 21 of whom have served more than three sentences, and some of them from twelve to twenty. These two shoals, alcohol and drugs, upon which 36 per cent of the population were wrecked, are obviously environmental problems which are subject to a certain amount of modification. And it is not sufficient to accept the fatalistic view on the feeble-minded problem without making an effort to determine the environmental factors which tend toward production of crime, even in the absence of mental defect.

In considering this large group, where one is strongly inclined to believe that there is no marked defect in the intelligence of the individual and that there does exist sufficient intellect, judgment and reasoning to permit these men to decide the rightness or wrongness of the act which brought them in contact with the law, to what can we turn to explain these antisocial acts? In a large dispensary clinic like that of the Psychopathic Hospital, one finds many individuals very early in life struggling blindly (as every other human being does) to attain their share or some portion of what they may consider their share of happiness. Quite naturally they form their ideas of happiness, or perhaps more fundamentally and appropriately what ought to be called pleasure, from the environment into which they have been born. During these early years of life, the child is acting purely on the instinctive level where good and bad is interpreted in terms of pleasure and pain, and moral judgments are as yet unformed.

The correlation between these early character twists, as seen in a dispensary clinic, and the end-results as manifested in crime and seen in our reformatories and prisons, is not only intensely interesting but equally important. Any attempts to minimize crime, to understand and reform the criminal (rather than

punish him), cannot neglect a study of the sources from which conduct gets its driving forces and the environmental factors which tend to guide and direct the force.

1. Recently a little girl, just under fifteen, was brought to me at the out-patient clinic with a history of having entered the home of a girl chum and stolen various articles. The home conditions of the patient were good. The school history was that of the average child of her age. Physical and mental development normal; mental age, $12\frac{1}{2}$; no history of misconduct prior to February, 1921. When she found the key to her friend's house in the cloakroom at school, she entertained the idea at once of entering her home and obtaining a dress and several other articles which she coveted. The patient was quite frank in relating the story of her delinquencies, and at no time has she made any effort to minimize the misdeeds. It appears that her girl chum, whose house she entered by means of the lost key, had just gone into long dresses and that for some time past the patient has been very envious of her chum's clothes, which were more pretentious than her own. Whenever her chum came out in new clothes or displayed new things, an unkindly feeling was awakened in the patient. Towards others than her chum, this feeling was not marked.

Here we are dealing with an emotion (envy) which is common to all of us in varying degrees, but in this particular case it is exaggerated and reinforced by jealousy, and has led to conduct which one must consider antisocial. It is most important for this individual to appreciate her inclinations toward being envious, and that it is an undesirable character trait which must be overcome ere it leads her into serious difficulty. The negative self-feeling and the sense of being denied which accompanies, in fact is the basis of envy (McDougall), produces an emotional state which is apt to linger a long time and demand satisfaction frequently in some antisocial act.

It is an old and interesting observation in relation to human reactions that it is invariably easier to lend a helping hand, to be genuinely sympathetic, to experience real sorrow at the downfall or misfortune of a friend, than to rejoice and be exceedingly glad when he is successful. There is nothing that puts a friendship to a greater test than to see some one who has always shared the same social, intellectual and economic level suddenly or gradually forge ahead to reach heights and accomplish aims which make a gulf of which we are conscious. Envy, though it

may never be expressed or even admitted, steals into the life of him who has been left behind, and frequently there is bitterness in his heart.

2. The following is the brief history of a boy fourteen years of age, who recently came under my observation for the following reasons: had been peculiar, had attacks of temper, lost control of himself, threatened to kill his mother, said to have assaulted a small boy on slight provocation.

His home environment has been good. His father, who died two years ago, was a graduate of Harvard University. He was a rather visionary man, who thought a good deal and accomplished very little. His mother is an intelligent, refined woman, who now earns a living for herself and the patient. His developmental history is negative. He had a tendency to be precocious, both mentally and physically. He finished the eighth grade, doing well, though not brilliantly. Mental age, $12\frac{3}{4}$ years. He started in high school, but gave it up on account of nervousness. He then worked in two different laboratories, as an assistant, doing very satisfactory work. He had the usual interest in amusements of the average boy. Has always been ambitious. Was not seclusive or given to depressed periods. Since the death of his father (two years ago) a change has been noticed in him. He has had periods of moodiness, depression and violent outbursts of temper. These last are usually directed against his mother, though occasionally against the neighborhood boys. He once injured a small boy by twisting his arm. In his outbursts, he is quite wild in his behavior, is profane, and on one occasion threatened his mother with a knife. They have increased both in frequency and intensity. He has also been increasingly disobedient and defiant, and has resented any restraint. However, when in the presence of authority, such as a physician, he manifests a certain amount of control, which disappears again when the restraining influence is gone, and he then only abuses his mother the more.

During this same period (since his father's death), he has developed a certain grandiose trend. In an indefinite way, he expects to go through school and college, to study in Germany, and, returning home, to discover and create things. His particular interest is in chemistry and physics. He goes so far as to buy apparatus with money earned, and performs experiments; but, just as his plans for further education are hazy and formless, so the experiments are usually of a rambling nature, with no well-

directed aim or purpose. His ambition and his feeling of superiority loom large, but he shows impatience in doing the necessary drudgery to attain what he wishes and thinks himself capable of doing.

There is a history of minor pilfering over a period of a few months, usually from people he dislikes. Once he was surprised by his mother in erotic practices and was severely upbraided. He reacted in a despairing, contrite manner, was very self-depreciating and threatened to kill himself. This attitude was in marked contrast to his defiance of difference of opinion in other matters.

It is of interest that, notwithstanding the fact that delusions and hallucinations are absent, he does present marked mystical tendencies. In common with his mother and father, he has a belief in spiritualism. He has received messages, he says, from his father, and feels the possibility of mediumship power in himself. Music has a strange effect upon him which he has difficulty in describing. It is usually accompanied by deep melancholy and thoughts of his father. He has visions of his father in objects just as he is about to go to sleep. He practices concentration, and at such times is able to make blank the faculties he uses every day, and sees things "where the brain used to be."

In the foregoing case, one dates the origin of the character twists from the death of the boy's father. It may have been the restraining hand which guided and directed the lad's activities along the proper channels, or, what is more likely, it was the lad's unusual attachment and the high esteem in which he held his father. To him, his father was his ideal man of education and unlimited possibilities. It mattered not that none of these possibilities had been realized. The approbation which came from his father was in itself sufficient reward, and to him the greatest of all pleasures. Therefore it is not surprising that upon the death of the father, followed the depression and the suicidal ideas. He felt that he was no longer understood and it was only a man like his father who was capable of understanding him. Nothing seemed worth while. No longer was there any praise or blame for which he cared. Nothing but definite, rigid, iron-bound authority held him in check. Life and its realities gave him no pleasure. It was here that he began to play with spiritualism, to indulge in autohypnotic states, hypnogogic hallucinations and expansive ideas. He was out of harmony with the

world in general and was being dominated entirely by his emotions. He indulged in erotic practices and permitted his anger to be expressed without any inhibitions, threatened his mother and abused his playmate. Thus we find both the motor and mental aspects of this boy's life operating without direction or restraint, obviously a condition which will lead him into serious conflicts with society unless a way is found by which he can adapt himself to his environment or some modification of his environment, in order that he may meet the problems of every day life in a normal, healthy way.

3. Another case, a girl, aged twenty, was brought to the clinic for a routine mental examination, with a question of having an honorable discharge from parole. From a bad-tempered girl, who was delinquent in many respects, she has, through training, become self-controlled and trustworthy. Her father is a street laborer, and, though a steady worker, is said to be a moderate drinker, very excitable, unreasonable, and very unsympathetic towards the patient. When young, he was said to have been "wild." Her mother, who is dead, though illiterate, was a good, efficient woman. The stepmother, on the other hand, has quite a different makeup, and has, on occasion, abused the patient. There are several siblings, two of whom, brothers, ran away and are otherwise delinquent. The others are well behaved.

As for the patient, she was said to have been a "nervous" child. Had enuresis up to the age of thirteen and has been treated for both syphilis and gonorrhœa. When fourteen, she was dismissed from the sixth grade because of irregular attendance, as her stepmother kept her at home frequently to help care for the other children. There is no question of mental deficiency or retardation (mental age, fourteen). She was very unhappy at home as she received sympathy and affection from no one and had to work very hard. It is not surprising that, under existing conditions, certain delinquencies began to manifest themselves. She began to take money from her father, and when thirteen, would often stay out late at night. Later, she had a record of being sexually promiscuous. Eventually she was placed with an agency. For several years her delinquencies persisted and were associated with periods of sullenness and depression. Finally, she made contact with an environment which meant much to her future welfare. Through training, example and kindness, she learned to control her moods and to get a proper perspective on social standards and values. As a

result, she was much happier, became an efficient worker, and was honest and straightforward in her dealings with others.

4. Following is the history of a boy, aged thirteen, who, without any previous record of conduct disorder, committed larceny. His family and developmental history are negative. His father was drowned when patient was a year old, and he has been living with a foster mother who thinks well of him, and with whom he is apparently happy.

He has an unusual makeup and is unlike the average boy of his age, inasmuch as he does not care to go about in groups with them, playing games, etc., and heretofore he has never gotten into the usual trouble which most boys are apt to through their practical jokes and minor delinquencies. He has always been considered honest and truthful. He has a good school record (mental age, eleven). He is very quiet, talks but little, and spends most of his spare time in designing and building aeroplanes. He spends much time reading books of adventure and ones that are inclined to be sensational.

Out of this background, and much to the surprise of those who know him, he deliberately planned and broke into a small store with the intent of obtaining money from the cash drawer. The idea first came to him while doing an errand for his foster mother on Sunday evening. He looked the situation over during the week, obtained a knife with which to remove the putty from the window, and planned to make an entry. He was detected by the police, taken to court, put on probation, and later sent to the clinic for mental examination. Up to the present time, the only explanation we have been able to obtain is that he got the idea from the newspapers.

The foregoing is the history of a case that is under observation, and represents well a rather large group of individuals where some antisocial act of more or less gravity obtrudes into the life of the individual. Sometimes these acts are premeditated with great care and consideration. More frequently, they are of an impulsive nature, and it is with great difficulty that one is able to determine the factors which make for these delinquencies. We attempt to satisfy ourselves by calling them accidental offenders, but "after all is said and done," this simply indicates we have not been able to correlate the cause and the effect. It is of greatest importance that these cases be treated with utmost consideration and that in so far as possible to minimize the moral aspect of the antisocial act. It is not infrequent that we

find individuals developing a very marked feeling of inferiority, and condemning themselves out of all proportion to the gravity of their misdemeanors. We also find that the friends and relatives, in their effort to make the misconduct of the individual a lesson not to be forgotten, are continually reminding him of his weakness, until the individual feels that it is quite impossible to outlive his present disgrace. The courts, reformatories and prisons should be utilized only after other measures have failed, and it is here that the psychiatric out-patient clinic may serve both the courts and the community by providing treatment rather than punishment for the juvenile delinquents.

5. This small boy, aged six, was brought to the clinic because of his cruel behavior. Both his heredity and his home environment are very poor. He was the child of his mother's second husband, she having been divorced from her first husband when nineteen years of age, because of desertion. His father was an epileptic and a hard drinking man, cruel and abusive to his family, whom he deserted periodically. He is the oldest of eighteen children, barely passes the illiteracy test and never adequately provided for his family. The patient's mother is a strong, healthy woman with a good reputation, has always worked hard for herself and her children. Was continually abused by the patient's father, even when pregnant. Their home was one of poverty and hardship, where there was continual quarreling between the parents.

Patient lived with his mother until six years of age, when he was placed in an excellent home with a motherly and refined foster mother. There is nothing of note regarding birth of patient and early development. He had the usual children's diseases. He has attended school but three weeks in all. There is, however, at present, no question of mental retardation (mental age, six years).

By the time he was three years of age, he was a well-trained child, cleanly in dress and habits, and with no evidence of intellectual inferiority or personality defects. It is of interest to note that during the next three years, owing to economic stress, the mother found it necessary to be away from home practically all the time. It was during this period that a change was first noticed in the lad's personal habits.

In April, 1920, he was sent to the State Infirmary with a severe case of whooping cough, and during this time was considered dangerously ill. He was discharged ten months later,

February, 1921. Both mother and father visited the child separately, without the other's knowledge, and each reported a peculiar mental change in child and also an indescribable change in personal appearance.

Dating from that time, he has become untrained in personal habits. He eats what is put before him, bolting his food. He will dress himself only if some one will stand by to make him; otherwise he will make no attempt, and in undressing, he simply rips his clothes off. He is an habitual bed wetter. He has no sense of decency and will expose himself before people without shame. He had what have been called "stubborn fits," when from ten to fifteen minutes he would make no response to questions, even when attempt was made to interest him. These spells would occur either when sitting in a chair or walking the streets. His face would become pale and he would grit his teeth. There were no further epileptoid manifestations. Because of his tendency to cruelty, he cannot be left alone with younger children. He will do such things as bending their fingers back until they scream and will throw anything at them upon which he can lay his hands. If there is nothing handy, he will grab off his shoes and throw them. If any one attempts to retaliate, he immediately shows his cowardly side. Neither punishment nor coaxing has any effect upon changing his behavior. He would, at times, have periods of one or two days' duration when he is passive, dull, sullen and morose.

A few weeks previous to his examination in the clinic it was noticed he was cruel to chickens. He would very deliberately, and apparently not excitedly or angrily, attempt to tear a chicken apart by pulling the legs in opposite directions. He probably would have succeeded in killing several had he not been prevented. Lately, he has also bitten three boys, and has repeatedly bitten himself when any one was present to observe it. There was no indication that he did it when alone. For five consecutive nights he has gotten out of bed, stripped his night clothes off, and raced naked about the house, awakening several people. He appeared to be having a glorious time, and, when put to bed, would roll out again and start the same thing over. He has been seen to kick inanimate objects, sometimes in play, more often viciously. On one occasion after leaving the clinic, he told the person who brought him that the doctor was down on him, hated him, and that he had struck and hurt him

when he (the patient) had not done a thing. He said he had hit the doctor in return.

Any attempt to understand the personality defects manifested in the above case must take into consideration, first, heredity; second, acquired physical illness; third, environmental factors. The patient's father was said to be an alcoholic and an epileptic, but probably a more intensive history would show that he was an individual of an unstable mental makeup who utilized alcohol as a crutch to help him over difficult situations, and that the convulsions were the result of his nervous instability plus alcohol. The heritage from such a parent, though perhaps not in itself sufficient to account for the personality defects in the offspring, had the extraneous factors, such as physical disease and bad environment, been eliminated, must be considered under the existing conditions. In fact, it is noted that during the first three years of the child's life, he was, apparently, quite normal. At this time, the influence of the mother was removed from the home, due to economic stress, and the lad was very much neglected. Too much freedom in such an environment must necessarily leave its mark on the character of the youth. We are quite aware that physical disease itself is capable of rendering marked changes in personality. The question of environment has been discussed in the consideration of the other cases and needs no further emphasis at this time. In the treatment of the above case, the only factor that is amenable to change at this time, is that of environment, and it is at this point that we must make our contact. The first important step is to place the child in such surroundings so he will receive judicious disciplining, proper education, and make daily contact with persons and things that will give him opportunities that he has hitherto not known.

A dissertation on such cases as have been recorded in the foregoing pages perhaps, at first thought, appears to be an elaboration of the obvious. The mechanism by which an attempt is made to explain many of the so-called character twists may be entirely erroneous, and further study of these cases in the light of a more comprehensive history and clearer understanding of the individual's mental makeup may require radical changes. It is neither the individual case nor the particular explanation upon which I wish to lay stress, but rather that large group of cases which come under observation of the parent, the teacher, the probation officer, the judge, and, finally, the

psychiatrist, and the general method by which each case should be studied. It is not sufficient to interpret their degree of responsibility in terms of intelligent quotient and mental ages, neither are we much enlightened or helped in the solution of our problem by seeking refuge in the fatalistic and pessimistic realm of heredity.

It is only after careful study into all the different aspects of the individual's life, which includes mental and physical heritage and the environment in which they have developed, that we can get a proper perspective between the cause and effect of their personality defects. Any analysis of conduct which does not take into consideration the instincts, emotions, and the will, as well as the intellect, cannot but fail to be productive of results that are worthy of consideration. Mercier, in a statement regarding conduct, makes it dependent upon desire, and, in conclusion, I will quote the following: —

Man is ever striving. He sets some aim before him. He seeks to accomplish some end. Corresponding with this attitude of man towards the world in which he lives, he has a fundamental attitude of mind which is called desire. Desire is the motive power of all conduct. Inherent in human nature are certain deep-rooted desires, which may probably all be traced to their derivation in one primitive and fundamental craving, which lies at the root of all human, as of all animal, dispositions. From each of these, many subsidiary desires are derived; and, in all conduct, desire of some kind is the motive power. Conduct is the means by which we seek to satisfy desire.

NOTE. — To Miss Sarah F. Schroedor I wish to express my thanks for the time and interest she has spent in getting the family history of the foregoing cases. — D. A. T.

A NOTE ON THE PATHOLOGY OF THE CHOROID PLEXUS IN GENERAL PARALYSIS.*

By A. E. TAFT, M.D., BOSTON.

The choroid plexus is made up of a mass of blood vessels surrounded everywhere by a layer of delicate connective tissue. This connective tissue layer is the basement membrane for the ependymal cells, which form the outer surface of the plexus, and which are continuous with the ependymal covering of the ventricular walls.

Two types of blood vessels make up the choroid plexus. One group has the usual structure of the arterial system, and lies in the midst of the plexus. Those of the second type are thin-walled vessels, on which the ependymal layer with its underlying connective tissue is applied, forming a finely villous structure.

The blood supply in man is obtained from the anterior choroid branch of the internal carotid and the posterolateral choroid, a branch of the posterior cerebral. The return of venous blood is through the choroid vein into the internal cerebral veins which join and form the vein of Galen (Boyd¹).

According to Mestrezat² and others, the function of the choroid is that of elective filtration; dialyzation through a membrane which has the power of holding back almost all substances other than those immediately necessary for the functioning of nerve tissue. Von Monakow,³ who has made a detailed study of its embryological development, classes the choroid plexus among the glands of internal secretion, and considers that its pathology plays an active part in schizophrenia; Mott also ascribes an internal secretory function. Tilney and Riley⁴ speak of it as the choroid gland. Schmidt concludes from the difference of composition between blood and spinal fluid that the latter is a secretion and not a transudate. Barbé⁵ has studied the permeability of the choroid plexus in subjects with various mental states, and in those without psychoses, by the use of a variety of fluids. He concludes that the passage of fluids through the walls varies according to the age of the subject, the final illness,

* From the Department of Neurosyphilis, Boston Psychopathic Hospital, Boston. This work was made possible through a grant from the United States Interdepartmental Social Hygiene Board, Washington, D. C.

the period post mortem and the fluid used in the test. The time is about the same in all patients without nervous or mental trouble; it is slowed in epilepsy, but general paresis appears to augment the permeability of the plexus.

Kitabayashi,⁶ working in von Monakow's laboratory, has made a rather extended study of the choroid plexus in mental disease. He found three types of alteration in his material: —

1. Plexus changes, mainly of connective tissue (mesodermal) with secondary glandular alterations.

2. Gland parenchyma (ectodermal) changes most prominent with secondary proliferation or atrophy of connective tissue elements.

3. Both types of tissue about equally involved.

Two interesting papers have come from Obersteiner's laboratory — one by Yoshimura⁷ on histochemical findings, which has no direct place in this consideration, and another by Imamura⁸ describing and illustrating the formation of the calcareous granules. He concludes that a coagulated, homogeneous mass is first laid down between the connective tissue fibers; that the cells then proliferate in layers, one on the other, and within this body calcium salts are deposited.

The brains, from which was derived the material here commented on, were being studied from quite a different point of view, when a chance remark in a current medical journal, on the need of more work on the choroid plexus, suggested making use of the available choroid tissue. No exhaustive review of the literature has been attempted. A limited search, however, has shown that the choroid has by no means been neglected, but apparently books of reference fail to include the results yielded by the work of various investigators from time to time, and as a review of the literature is time consuming, studies fail to reach the attention of the reader of general medical publications.

Although the choroid tissue studied was obtained wholly from general paralytic subjects, the findings were not peculiar to this condition.

The pathologic changes existing in the different specimens represent a progressive alteration. With little, if any, change in the walls of the nutrient arteries (Type 1), the connective tissue underlying the ependyma, and surrounding the villous capillaries (Type 2), begins to increase, encroaching gradually on the lumen of the minute vessel until it is entirely obliterated. This villus then appears as a tuft of fibrous tissue, without

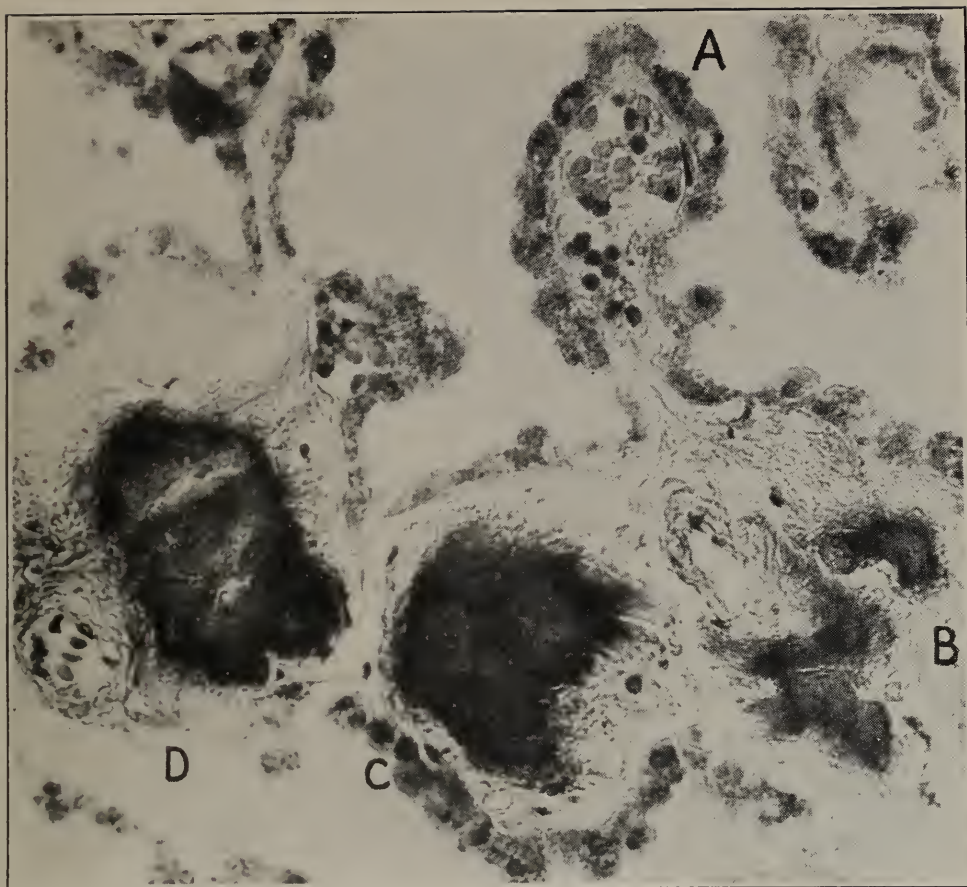


FIG. 1. — *A*, relatively normal choroid villi; *B*, fibrous tuft with partial calcification; *C* and *D*, nearly complete calcification. Ependymal cells are present.

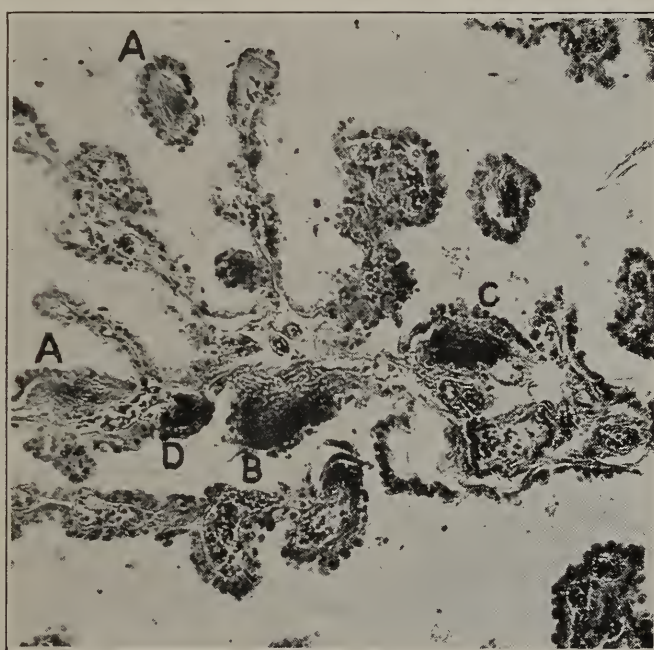


FIG. 2. — *A*, fibrous replacement of capillaries; *B*, *C*, *D*, calcification of fibrosed capillaries.

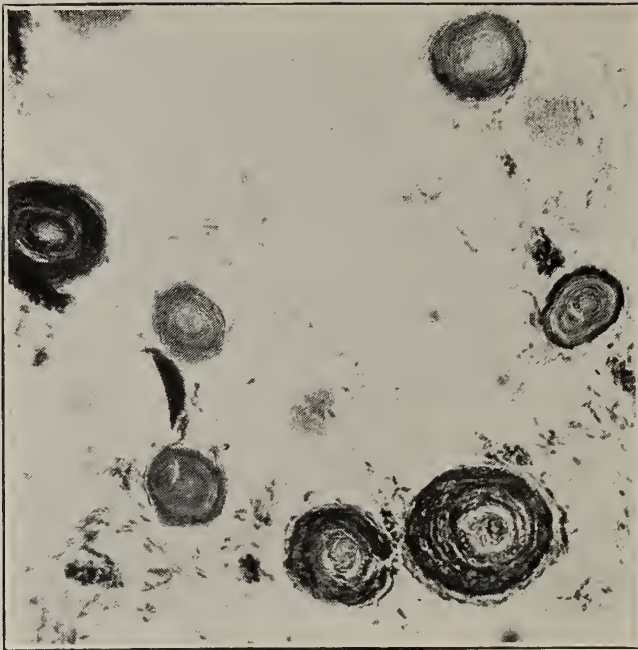


FIG. 3. — Calcareous granules; concentric formation;
high power.

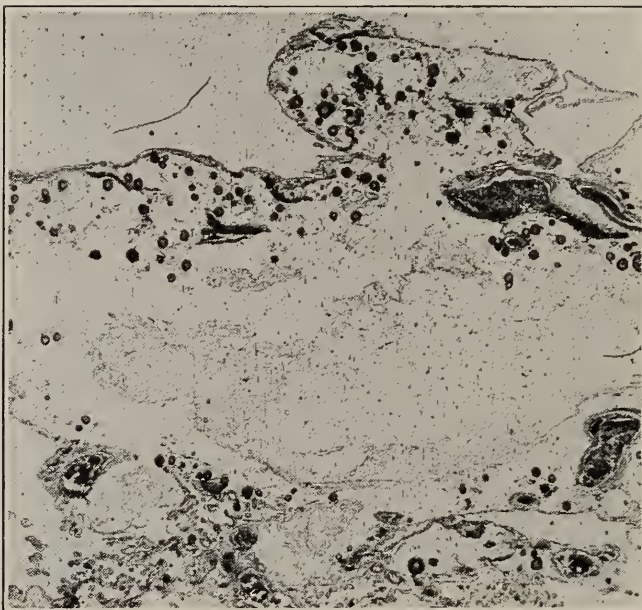


FIG. 4. — Cystic choroid plexus, showing entire loss of
capillaries; made up chiefly of a loose reticulum in
which are many calcareous granules; low power.

nuclei (Fig. 1). It has not the concentric arrangement commonly seen in obliterative arteritis, but is merely a nodule of fibrous tissue. The delicate outline of the villus is lost, and then follows the deposit of calcium salts until a calcareous granule is formed, which, on section, presents the usual concentric pattern (Fig. 2). When the fibrosis has gone on to an extreme degree the choroid appears merely as an elongated, cystic body with no suggestion of its normal villous structure (Fig. 3). On section, the usual landmarks are found to be entirely lacking, and in their place is a loose meshed reticulum in which the encapsulated calcareous granules are held and through which the more or less normal arteries pass. The cyst wall presents the same basement membrane, supporting still quite normal appearing ependymal cells, not markedly different from the appearance of those in the normal specimen surrounding the capillaries. In one instance, there was slight thickening of the basement membrane in which were many congested capillaries, a picture familiar in the ependymal surface of the ventricles in ependymitis (Fig. 4). The ependymal cells were still present in this case, and showed no notable morphologic change.

The question of the relation, finally, of the capillaries and the ependymal cells made this study interesting. In general paresis there is no lack of spinal fluid, generally considered as a product of the choroid plexus. On the contrary, dilated ventricles is one of the most common conditions in this disease, and is by many considered due to increased pressure of the fluid.

If the cerebrospinal fluid continues to appear as is evident in spite of the obliteration of the choroid capillaries, the source would not seem to be one of filtration, however qualified. On the other hand, is one justified in concluding that the persisting ependymal cells are capable of functioning in the rôle of gland cells without the presence of the capillaries with which they normally stand in relation?

SUMMARY.

The choroid plexus is made up of numerous capillaries surrounded by a thin layer of connective tissue on which are the ependymal cells.

The choroid plexus is an important factor in the production of cerebrospinal fluid, either by means of selective filtration or by secretion.

In the sections studied, a progressive fibrous change was

traced, beginning with general increase of connective tissue, followed by obliteration of capillaries, with formation of fibrous tufts, in which calcium salts are deposited, and final cystic condition of the plexus. At this stage the capillaries have entirely disappeared, but the ependymal cells remain and are little changed morphologically.

In view of these findings, what shall be concluded as to the relation of the capillaries to the production of cerebrospinal fluid, which here suffers no reduction in amount?⁹

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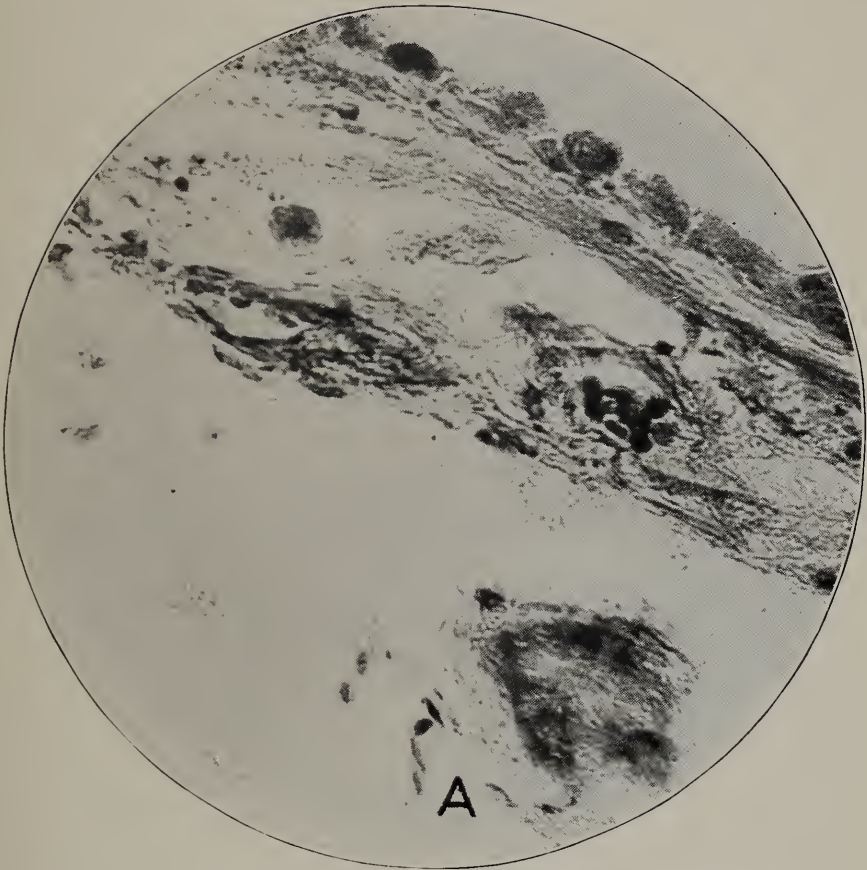


FIG. 5. — Thickened wall of cystic choroid, with calcareous granule in field A.

PATHOLOGY AS RELATED TO PSYCHIATRY.*

BY JAMES V. MAY, M.D.,

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Pathological research, in so far as it relates to psychiatry, may be said to date from the publication of Morgagni's² "*De Sedibus et Causis Morborum*, etc.," which appeared in 1761. He found indurations of the cerebral cortex in the insane, but was of the opinion that the cerebellum was softer than in normal individuals. In one case the cortex was of a brownish hue, the blood vessels being much distended. In another there was a softening of the fornix, fullness of the cerebral vessels, adhesions of the pia and an injection of the meninges. His observations were based on an examination of some thirteen cases in all. He was probably the first to call attention to the relation between mental disorders and lesions of the pineal gland, to which, it must be confessed, he attached an undue importance. An exceedingly interesting statement is to be found in Morgagni's book:² —

Melancholia is so nearly allied to mania, that the diseases frequently alternate, and pass into one another; so that you frequently see physicians in doubt whether they should call a patient a melancholiac or a maniac, taciturnity and fear alternating with audacity in the same patient; on which account, when I have asked under what kind of delirium the insane persons have labored whose heads I was about to dissect, I have had the more patience in receiving answers which were frequently ambiguous and sometimes antagonistic to each other, yet, which were, perhaps, true in the long course of the insanity.

Grading³ in 1790 made an analysis of the post-mortem findings in 216 cases of mental disease. He reported variations of the thickness of the skull, adhesions and thickenings of the dura, changes in the consistency of the cerebrum and cerebellum, effusions under the dura and into the ventricles and various other pathological changes. He also reported lesions in the pineal gland. Haslam in 1798 published the report of his

* Read at the dedication of the George Alder Blumer Research Laboratory at the Utica State Hospital, June 4, 1921.

findings in 37 autopsies. In not one of these cases, we are told, was the brain and its membranes free from evidence of disease. His findings were more or less similar to those of Greding. The indurations of the brain were noted by Arnold (1782), who, according to Tuke, found an increased density "of those parts of the brain by means of which the soul is connected with the body." These various observations led Haller² to the conclusion that "when, in some rare instances, we can discover no disease in these parts, we may conclude either that it is seated in their very elementary particles, or has not been sought for with sufficient patience and attention." Portal, another contemporary, went further than this: —

Morbid alteration in the brain or spinal marrow has been so continually observed, that I would greatly prefer to doubt the sufficiency of my senses, if I should not at any time discover any morbid change in the brain, than to believe that mental disease could exist without any physical disorder in this viscus, or in one or other of its appurtenances.

Other observers, however, reported entirely different results. Pinel in 1826, in 277 autopsies, found changes in the brain in only 68, and Esquirol in only 77 of 277 cases. On the other hand, Chiarugi (1795) found changes in the brain in 95 of 100 cases examined, Parchappe (1838) in 152 of a total of 160 reported, and Webster (1844) in every one of his 72 cases.

These findings led to widely diverging views. Pinel² in 1791, for instance, in discussing Greding's work, said: —

But although one must eulogize his efforts to throw new light upon the organic affections of the insane, is it possible to establish any relation between the physical appearances manifested after death and the lesions of intellectual function which have been observed during life? What analogous varieties does not one find in the skull and brain of persons who have never shown any sign of aberration of mind! And, therefore, how can we succeed in fixing the limits which separate that which is normal from that which must be held to be the result of disease?

Bayle's article in 1822 on the nature of general paralysis and Calmeil's "Memoires" in 1826 on the same subject were of far-reaching historical importance. They established the integrity of general paresis as a clinical entity and gave the disease the name it now bears. Bayle called attention to the chronic form of meningitis occurring in paresis, and Calmeil in 1859 suggested the name "*periencephalitis chronica diffusa*." Guislain in 1836

classed the lesions found in insanity under nine headings, — congestion of the brain or meninges or both, serous congestions, cerebral softening, adhesions of the membranes to each other or to the brain, cerebral induration, cerebral hypertrophy, and abnormalities of the brain or skull. Esquirol, who had himself made some very important contributions to the pathology of mental diseases, came finally to the conclusion that very little had been accomplished. In his Charenton report (1835) he expressed himself as follows: —

However important may have been the researches of anatomists made during our days into diseases which affect the mind, we may venture to repeat that pathological anatomy is yet silent as to the seat of madness and that it has not yet demonstrated what is the precise alteration in the encephalon which gives rise to this disease. What shall we, then, think of the rash pretensions of those who assume that they can fix upon the diseased portion of the brain, judging merely from the character of the disease?

Foville presented a very elaborate paper on researches relating to the structure of the brain, at the Academy of Science in 1828. As a result of his investigations he suggested that morbid changes in the cortex are directly responsible for intellectual derangements and that lesions in the white matter led to motor disturbances.

In the meanwhile some very interesting things were happening in Germany. Heinroth, who first held the title "Professor of Psychiatry" (at Leipsic in 1811), and whose "*Lehrbuch der Seelenkunde*" appeared in 1818, is usually held responsible for starting a controversy which at times became very acrimonious and almost disrupted the German school of psychiatry. Bucknill and Tuke² ascribe the following to Heinroth: —

Insanity is the loss of moral liberty. It never depends upon a physical cause; it is not a disease of the body but of the mind — a sin. It is not and cannot be hereditary, because the thinking ego, the soul, is not hereditary. . . . The man who has during his whole life before his eyes and in his heart the image of God, has no reason to fear that he will lose his reason. . . . Man possesses a certain moral power which cannot be conquered by any physical power, and which only falls under the weight of his own faults.

Some question has, I believe, been raised as to the accuracy of this statement of Heinroth's views. The position of the so-

called psychic school was outlined by von Feuchtersleben⁴ (1845) as follows: —

The mind is the immediate seat of the disease, the bodily suffering is secondary. Mental disorders may be clearly traced to their origin, Sin, Error, Passion. Diseases of the brain, on the contrary and of all the organs, occur, even in the greatest intensity, without mental disturbance, as also the latter without the former. The psychical mode of cure is that which is properly efficient; the somatic remedies in reality act psychically; for instance, through pain, diversion of the thoughts, stupefaction, terror. Pathological anatomy has not discovered any decided relation between disorganization of the brain and mental disorders.

As Heinroth himself expressed it "From wrong doing springs all misfortune, including the disorders of the mind." One of the most able exponents and spokesmen of the somatic school was J. B. Freidreich, who in 1836 set forth the following reasons for disagreeing with Heinroth: (1) Because the mind cannot become diseased. (2) Because the greater part of the causes producing these conditions is somatic. (3) Because in all mental disorders there are somatic symptoms in addition. (4) Because they are too permanent for pure conditions of the mind. (5) Because they are subject to cosmical and telluric states. (6) Because their cures always take place in a material way. (7) Because they are not infrequently removed by strong material influences. (8) Because the somatic mode of cure alone has a direct sanatory effect, the psychical at most an indirect effect on the body. (9) Because the occurrence of psychical indisposition on one side only must arise from the duality of the brain. (10) Because the return of reason before death occurs in cases not only of psychical, but likewise of somatic diseases, and may be physically accounted for. (11) Because mental disorders correspond with the temperaments. (12) Because it may be proved that there are psychical conditions which depend on organic causes, and are therefore very analogous to psychical disorders. (13) Because chronic delirium (mania) can be no other than febrile.

In the light of our present knowledge, inadequate as it is, this controversy seems absurd. It is interesting, however, in that it reflects the psychiatry of that day and represents a rather definite stage in the development of our present views of pathology as related to mental diseases. In 1871 the immortal John P. Gray of Utica made an eloquent plea for the extension of pathological research in our hospitals, and based his argu-

ments on the relation existing between mental diseases and recognized physical causes. In an article read before the Medical Society of the State of New York he called attention to the fact that in a study of the admissions at Utica during a period of twenty-seven years the moral causes of insanity as shown in the hospital reports had steadily dropped from over 46 per cent in 1843 until 1867 when none at all were shown. On the other hand, the physical causes as reported had increased from 33 per cent in 1843 to over 77 per cent in 1868. "With the consummate skill of a great advocate," as Meyer⁵ expressed it in commenting on this remarkable contribution of Gray's, "he knits his arguments in favor of the examination of secretions, and of the pulse with the sphygmograph, to get at the physical foundations of the mental manifestations and at the effect of medicines; he advocated the use of the ophthalmoscope, a study of the condition of the skin, post-mortem studies, and the photographing of specimens." The views on this subject entertained by Dr. Gray resulted in the appointment of Dr. Edward R. Hun as pathologist at the Utica State Hospital in 1868, as far as can be determined the first appointment of the kind in America. The researches of Hun and others at Utica were undoubtedly largely responsible for the organization of the Pathological Institute in New York City in 1896. No modern well-equipped hospital for mental diseases is looked upon to-day as being complete unless it includes in its scheme of organization a pathological laboratory.

We may now logically raise the question as to what has been accomplished. What has pathological research contributed to our present knowledge of psychiatry?

In spite of the remarkable progress which has been made during the last few decades we are still on very uncertain grounds in our discussion of psychiatric conceptions. "Overawed," as Dr. Meyer⁵ puts it, "by the difficulty of doing better, and in deference to the Græco-Roman traditions revived in the days of the French school by Pinel and his continental and English followers; psychiatry had long adhered to a very simple division of mental disorders into mania, melancholia and dementia, from which general paralysis was soon split off as a sort of concession and deviation from the traditional psychologizing scheme." It is true that we have now definitely and finally gotten past this preliminary stage. The publication of Kraepelin's sixth edition in 1899 resulted in the establishment of manic-depressive insanity

and dementia præcox as definite entities. Even Kraepelin's views on these subjects, however, have varied somewhat from time to time. The description of dementia præcox and paraphrenia in his eighth edition represents a wide departure from the dementia præcox described by him in 1896. He referred to it then, as he does now, however, as an endogenous disorder, of indefinite origin. Alzheimer's efforts to establish a definite anatomical basis for the development of the disease have not been generally accepted. Kraepelin in his Heidelberg cases found an hereditary predisposition in 70 per cent of his cases where definite information was obtainable. He also discusses the influence of certain psychopathic traits in the personality of the individual. These are more or less comparable to the "shut in" personality described by Hoch. The psychogenic factors have been given much consideration of late, and the importance of correct mental habits was very strongly emphasized by Meyer in his address at Toronto in 1906. Kraepelin's conception of involution melancholia as originally outlined has been entirely abandoned in his later editions following the criticism of Dreyfuss in 1907. Mania and melancholia were classified by Kraepelin as constitutional disorders in 1896 and he now speaks of manic, depressive, irritable and cyclothymic "makeup" as the soil in which manic-depressive insanity develops. In spite of the elaborate statistical studies of manic-depressive insanity and dementia præcox, and notwithstanding the accomplishment of the Mendelian school of research, we do not know as yet exactly what part heredity plays in the etiology of these diseases. The same may be said of the psychoneuroses. We are not in a position to say that there is, or is not, an anatomical basis for these conditions which pathologists have not as yet been able to clearly define. Eliminating these considerations, it may be said that we have a fairly definite pathology for the other psychoses. The statement is, I think, warranted, at least, that psychiatry has made as much progress in this direction as the other specialized departments of modern medicine. It should not be forgotten that there is no pathological basis known for many of the infectious processes and so-called general diseases coming within the domain of the internist. Certainly we can anticipate with a reasonable degree of accuracy the post-mortem findings in the traumatic, the senile psychoses, the arteriosclerotic disorders, general paralysis, cerebral syphilis, brain tumors, the psychoses with many other brain and nervous diseases included

in the classification of the American Psychiatric Association, many of the mental disturbances accompanying the somatic diseases, the epileptic psychoses and mental deficiency. This covers approximately everything not accounted for by constitutional factors, defects in the germ plasm, or toxic and purely functional disturbances.

Attention was first called to the study of traumatic conditions in this country by Harlow's⁶ report in 1868 on the famous crowbar case. While blasting in Vermont in 1848, a man had a crowbar driven completely through the frontal region of his skull; he made a complete recovery and lived for over twelve years after the injury. An autopsy showed that the prefrontal region only was involved. Careful observations of the case showed that, although physically well, his efficiency as a workman was gone. He became irritable, fitful, profane, obstinate and suspicious, — "a child in his intellectual capacity," as Harlow expressed it. In brief, there was a decided change in personality strongly suggesting Meyer's traumatic constitution or possibly a defect disorder. Traumatic conditions were studied by Ericksen in 1866, Page in 1882, Oppenheim in 1889, by Charcot and various others. In 1892 Friedmann described a vasomotor symptom complex due to traumatism. The pathological changes found in the traumatic neuroses were made the subject of an exhaustive study in 1897 by Köppen, who found more particularly a localized encephalitis with hemorrhagic infiltration and foci of softening in the cerebral cortex. The most important contribution on the subject of traumatic psychoses, however, was that of Adolf Meyer⁷ in 1903, who proposed a classification of those conditions which has never been improved upon by subsequent writers. The most interesting feature of the classification, perhaps, was his post-traumatic constitution. Practically the same condition was described by Schläger in 1857 as quoted later in Griesinger's work. The importance of trauma as a precipitating factor in other psychoses, particularly general paresis, as pointed out by Meyer, has never been given sufficient attention. An article by Osnato on this subject has appeared very recently. Significant also are the associated dream states, suggesting hysteria and epilepsy, characterized by "the occurrence of complete dream interpretations and peculiar fabrications which color the primary traumatic insanity." Considerable space is devoted by Kraepelin in his last edition to the pathological findings in traumatic conditions.

The changes in the senile brain and the presenile psychoses have been studied exhaustively by Nissl, Alzheimer and many others. Many of the alterations described in the neurones are found in these conditions, particularly the pigment deposits. Kraepelin describes very definite findings in the advanced senile deteriorations. Alzheimer has described a senile atrophy or wasting of the cortex which is found in some cases. This is due to a gradual occlusion of small vessels leading either to hemorrhages, softenings or an atrophic area characterized particularly by a marked cell loss. The presence of the so-called miliary plaques in the cortex was first reported by Blocq and Marinesco in 1892. They have been given a great deal of consideration since that time. They were spoken of by Redlich as "miliaren sclerosen" in 1898 and by Fischer as "miliare nekrosen" in 1907. The latter reached the conclusion that these "drusen," as they are often called, were characteristic of presbyophrenia. Oppenheim, in 1909, showed that they were to be found in individuals without psychoses. They are, however, unquestionably associated with senile and presenile conditions. The significance and the origin of these "drusen" remain somewhat uncertain at the present time. In 1906 Alzheimer described a symptom complex which now bears his name. As is now well known, it is a presenile condition with a well-defined symptomatology, characterized pathologically by the presence of miliary "drusen" and a peculiar form of intracellular neurofibril degeneration. Alzheimer's disease is described as appearing usually about the fortieth year of age. Kraepelin speaks of it as a sort of a "senium præcox."

Of no less importance are the mental disturbances clearly attributable to cerebral arteriosclerosis. These have been very adequately described and classified at various times by Lambert. Heubner was originally of the opinion that the sclerosis of the cerebral vessels was always specific in origin. Baumgarten, however, showed conclusively that this was not the case. The changes in the vessel walls have been very elaborately detailed by Heubner and others. Friedländer, who first described endarteritis obliterans in 1876, has shown that it is probably always syphilitic in nature. Alzheimer has also called attention to a perivascular gliosis which is often found in the arteriosclerotic brain. Reference should be made to the chronic subcortical encephalitis which bears the name of Binswanger, who first called attention to its importance. It is an atrophic con-

dition resulting from a sclerotic involvement of the deeper marrow vessels. Clinically the arteriosclerotic disorders have not been given adequate consideration and are often overlooked or characterized as senile psychoses. It has been shown very conclusively that a diagnosis should not be based on an increased blood pressure alone. Kraepelin,⁸ moreover, found that approximately 14 per cent of his cases occurred in individuals fifty-five years of age or less. Thoma believes alcohol, coffee, tea and infectious poisons to be the most important etiological factors concerned.

The most important contributions of the pathological laboratory to modern psychiatry undoubtedly have to do with the studies of general paresis and cerebral syphilis. Our knowledge as to the cause and the diagnosis of general paresis, the nature of the disease itself and such therapeutic aids as we now have at our disposal have all had their source of origin in the laboratory. Although the disease has been known clinically since it was described by Haslam in 1798, it is only within the last few years that its pathology has been understood. In his sixth edition in 1899 Kraepelin was unwilling to admit that general paresis was nothing more than a manifestation of syphilis and he looked upon it as an intoxication affecting not merely the nervous system but the entire organism and related to syphilis in somewhat the same way that Addison's disease is to tuberculosis or myxedema to the thyroids. The various opinions expressed as to the percentage of cases showing a definite history of syphilis is not surprising when we consider the fact, as pointed out by Kraepelin, that Hirsche could only find a definite history of an initial lesion in 36 per cent of his cases of tertiary syphilis. The diagnostic difficulties relating to general paresis were cleared up generally by the studies of the cerebrospinal fluid by Widál, Sicard and Ravaut, following the introduction of lumbar puncture by Quincke in 1890. The isolation of the *treponema pallidum* by Schaudinn in 1905 settled the question for all time as to the cause of syphilis. The adaptation of the principles of the Bordet-Gengou phenomenon to the study of syphilitic fluids by Wassermann, Neisser and Bruck in 1906 furnished us with a serological test which has been of incalculable importance from a diagnostic point of view. The demonstration of the presence of the *treponema* in the cortex of parietic brains by Noguchi and Moore in 1913 definitely determined the relation between that disease and syphilis. These discoveries naturally

suggested a determined effort on the part of clinicians to effect a cure. Salvarsan, which became available in 1907 as a result of the remarkable researches of Ehrlich, was very logically the means employed for this purpose. It must be admitted at this time that the results obtained so far have been disappointing. In 1904 elaborate studies of the pathology of general paresis were published by Nissl and Alzheimer. This constitutes without question one of the most important events recorded in psychiatric history. It may be said, I think, that almost entirely as a result of the work of these two men our knowledge on this subject is practically complete. The post-mortem differentiation of the disease is a comparatively simple matter.

The pathology of cerebral syphilis so called, as distinguished clinically from general paresis, has been made the subject of exhaustive researches. Histologically, meningeal, endarteritic and gummatous forms have been differentiated. Here, again, we are deeply indebted to Nissl, and particularly Alzheimer. Just why we should have the various manifestations of this disease with which we are familiar cannot now be explained, notwithstanding the wonderful progress which has been made. The syphilitic forms of endarteritis have been described very fully by Heubner and differentiated by him from arteriosclerosis. Their recognition is now perfectly practicable in the laboratory. Recent laboratory investigations have shown that in many syphilitics, even in comparatively recent cases, a positive Wassermann reaction, an increase in the number of cells or in the protein content of the spinal fluid is occasionally encountered in cases showing no mental symptoms whatever. Warthin's⁹ observations are especially interesting. He found active manifestations of syphilis, post mortem, in eleven clinically cured cases and in twenty-five cases where there was no history of syphilis at all. In connection with these studies of syphilis some reference should be made to recent contributions on the subject of multiple sclerosis. Westphal in 1918 called attention to the presence of numerous rod cells in the foci of disease found in the cord. Sclerotic foci were also found in the brain. There was some round cell infiltration of the perivascular lymph spaces and occasional plasma cells. Marburg has also noted the presence of rod cells. Kuhn, Steiner and Siemerling have all found living spirochaetes in these foci. Siemerling, however, said, "It is not excluded that in multiple sclerosis there may also be other effective causes."

While the percentage of psychoses associated with brain

tumors is small, it is equally true that the post-mortem differentiation of the various forms of growths concerned is quite exact. Cushing found that two-thirds of the cases coming to his notice were gliomata. Endotheliomas are also very common. This is one field, at least, where the laboratory diagnosis is much more simple than the clinical differentiation. The fact that an intracranial growth often brings out a Korsakow symptom complex in alcoholic individuals is interesting. Schuster, who made an analysis of the findings in 775 cases of brain tumor in 1902, found mental symptoms in all cases where there were growths in the corpus callosum, in two-thirds of those with involvement of the hypophysis, in one-third of those in the cerebellum, and in one-fourth of the cases involving the brain stem. Kraepelin looks upon mental symptoms as being the result of four factors, — injuries to the brain structure, changes in intracranial pressure, circulatory disturbances, and the absorption of toxins. Growths in the frontal region sometimes produce symptoms strongly suggestive of general paresis.

The pathology of other conditions of the brain and nervous system usually associated with psychoses is, as a rule, well known. Cerebral hemorrhages, thromboses, embolisms, meningitis of various forms, and tabes are all fully described in the textbooks on pathology. We have even fairly clear descriptions of the pathology of encephalitis lethargica, first described in 1917, although the specific bacterial cause producing the disease has not been isolated at this time. It must be confessed with regret that the pathology of Huntington's chorea and Parkinson's disease is not as yet clear.

Nissl and Alzheimer have made important contributions to our knowledge of the pathological changes in the cortex which are to be found in infectious and other forms of delirium and have pointed out cell alterations which are fairly constant. In connection with these somatic disorders reference should be made to Meyer's "central neuritis," a condition originally described by Turner in 1899. No detailed description of the pathology of this disease is necessary in addressing any audience in New York. The axonal alteration characteristic of central neuritis has been found in so many cases of pellagra that several observers have confused it as being in some way specifically related to that disease.

Passing to the subject of epilepsy, we again find an important contribution by Alzheimer in his studies of the sclerosis of the cornu ammonis, a condition which he found in from 50 to 60

per cent of the cases he examined. The "Cajal cells" in the cortex, attention to which was called by Ranke, are particularly interesting. These are cells usually found in the superficial layers of the cortex of the newborn only. They have been found to be present in a considerable number of epileptics, and in certain of the mental deficiencies. This is interpreted as a cortical development defect.

The pathological changes to be found at autopsy in feeble-mindedness have been the subject of discussion for many years and are fairly constant. These lesions are, of course, practically all congenital defects and failures of development.

The interest recently developed in the field of endocrinology promises to open up new avenues of pathological research. In fact it has already done so. The problems presented by the thyroid, the pituitary, the thymus, the adrenals, the sexual glands, etc., have been attacked with a renewed energy which promises to be productive in time of most important results. This is a subject which is too extensive for consideration at this time. It must be conceded, however, that they are largely problems which belong to the domain of pathological research, and there we must look for their solution.

In conclusion, I think the statement is fully warranted that the future of psychiatry, whatever it may develop into, wherever it may lead, is inevitably linked with that of pathology.

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PROPOSED REORGANIZATION AND CONSOLIDATION OF STATE INSTITUTIONS IN MASSACHUSETTS.*

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The Constitutional Convention, at sessions held during the summers of 1917 and 1918, proposed nineteen amendments, which, at a later State election, were all accepted by the people. The last amendment adopted reads as follows:—

On or before January first, nineteen hundred twenty-one, the executive and administrative work of the commonwealth shall be organized in not more than twenty departments, in one of which every executive and administrative office, board and commission, except those officers serving directly under the governor or the council, shall be placed. Such departments shall be under such supervision and regulation as the general court may from time to time prescribe by law.

Such an amendment requires the consolidation and reorganization of more than one hundred existing State departments, boards and commissions into twenty grand divisions.

To carry out the provisions of this amendment the following bill was introduced into the Legislature:—

SECTION 1. The executive and administrative functions of the commonwealth, except such as pertain to the governor and council, or such as are performed by officers serving directly under the governor and council shall hereafter be carried on by the departments of the secretary of the commonwealth, the treasurer and receiver general, the auditor of the commonwealth and the attorney-general, and by certain executive departments hereby established, namely, the department of Examination and Registration, the department of Banking and Taxation, the department of Public Utilities, the department of Public Works, the department of Industries and Commerce, the department of Education, the department of Conservation and Production, the department of Protection and Sanitation, and the department of Public Institutions. All executive and administrative offices, boards and commissions, except those officers serving directly under the governor or the council are hereby placed in said departments, as hereafter provided; and all such offices, boards and commissions for which provision is not made herein shall be placed by order of the governor with the advice and consent of the council

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in the control of one of the departments hereby established until the general court shall make suitable provision therefor.

SECTION 2. Each of said executive departments shall be under the supervision and control of a director. Except as otherwise provided herein, directors shall be appointed by the governor with the consent of the council, and shall hold office for three years from the date upon which their appointment takes effect: *provided*, that of the first appointment hereunder the governor shall designate as nearly as may be equal numbers of said directors to serve respectively one, two and three years. Directors shall serve until their successors are chosen and qualified, and may at any time be removed by the governor with the consent of the council. Appointments of directors to fill vacancies shall be for the unexpired term.

Directors shall receive annual salaries to be fixed by the governor and council, not to exceed eight thousand dollars. The governor may in his discretion appoint a member of an office, board or commission included in a department to perform the duties of director in addition to his other functions, but if a director thus designated is a salaried officer of the commonwealth, he may receive additional compensation for services as such director not in excess of two thousand dollars.

SECTION 3. The director of an executive department may employ such clerical and other assistance as may be authorized by the governor and council. He shall approve the estimates submitted under sections three and four of chapter seven hundred and nineteen of the acts of the year nineteen hundred and twelve by offices, boards and commissions included in his department. He may make regulations for said offices, boards and commissions to insure the economical and efficient conduct of their business, to avoid duplication of functions, and to secure proper co-operation. He shall decide all questions as to the jurisdiction and authority of said offices, boards and commissions. The governor and council may, however, order the alteration and revocation of any regulation or decision so made. He may require any expenditures and contracts made by said offices, boards or commissions to be submitted to him for approval. Any member or employee of said offices, boards and commissions who fails to comply with the regulations, decisions and requirements of the director under the terms of this act may after hearing be removed by the governor with the consent of the council. The director shall make an annual report to the general court with such recommendations as he may deem expedient for legislation relative to the organization and conduct of his department or of any office, board or commission included therein, and shall report to the governor and council at such times and upon such matters as they may require. The secretary of the commonwealth, treasurer and receiver general, auditor of the commonwealth and attorney-general shall exercise like powers over offices, boards and commissions placed under their control.

SECTION 4. Subject to the provisions of this act, all offices, boards and commissions shall continue to exercise all functions vested in them by law, and except as modified hereby, all provisions of law relative to

such offices, boards and commissions shall be and remain in full force and effect.

SECTION 19. The following offices, boards and commissions shall be included in the department of Public Institutions, namely, the Massachusetts Bureau of Prisons, existing under authority of chapter two hundred and forty-one of the General Acts of the year nineteen hundred and sixteen; the several penal institutions under the supervision and control of the director of the Massachusetts Bureau of Prisons; the commission on mental diseases, existing under authority of chapter two hundred and eighty-five of the General Acts of the year nineteen hundred and sixteen; the several boards of trustees of the state institutions under the supervision of the commission on mental diseases; the state board of charity, existing under authority of chapter eighty-four of the Revised Laws and acts in amendment thereof and in addition thereto; the board of trustees of the state infirmary and state farm, existing under authority of chapter eighty-five of the Revised Laws and acts in amendment thereof and in addition thereto; the board of trustees of the Massachusetts training schools, existing under authority of chapter five hundred and sixty-six of the acts of the year nineteen hundred and eleven; the board of trustees of the Massachusetts Hospital School, existing under authority of chapter four hundred and forty-six of the acts of the year nineteen hundred and four as amended by chapter two hundred and twenty-six of the acts of the year nineteen hundred and seven; the board of trustees of the hospital cottages for children, existing under authority of section six of chapter five hundred and four of the acts of the year nineteen hundred and nine; the board of trustees of the Norfolk State Hospital, existing under authority of chapter five hundred and thirty of the acts of the year nineteen hundred and twelve, the trustees of the hospitals for consumptives existing under authority of chapter four hundred and seventy-four of the acts of the year nineteen hundred and seven as amended by chapter four hundred and ninety-one of the acts of the year nineteen hundred and ten; together with the several institutions under their control; and the commission on probation, existing under authority of section one of chapter four hundred and sixty-five of the acts of the year nineteen hundred and eight.

On Feb. 20, 1919, the Supervisor of Administration submitted a second supplementary report on the consolidation of State departments, boards, offices and institutions, as follows:—

AN ACT TO ESTABLISH THE DEPARTMENT OF INSTITUTIONS.

Be it enacted, etc., as follows:

SECTION 1. The commission on mental diseases established under the provisions of chapter two hundred eighty-five of the General Acts of the year nineteen hundred sixteen, the bureau of prisons established under the provisions of chapter two hundred forty-one of the General Acts of the year nineteen hundred sixteen and the board of parole estab-

lished under the provisions of said chapter two hundred forty-one are hereby abolished. All the rights, powers, duties and obligations conferred and imposed by law upon said commission, bureau and board, and all those conferred and imposed upon the State Board of Charity in connection with the supervision or control of any state institution, are hereby transferred to the department created by this act, and shall hereafter be exercised and performed by said department, which shall be in all respects the lawful successor of said commission, bureau and board and of the State Board of Charity in respect to all rights, powers, duties and obligations transferred therefrom. As soon as this act takes effect under the provisions of section ten, all books, papers, maps, charts, plans, records and other documents and equipment in the possession of said commission, bureau and board, and those relating to state institutions in the possession of the State Board of Charity, shall be delivered to the director of the department hereby established. All employees of said commission, bureau and board and those of the State Board of Charity whose duties relate to the supervision of state institutions shall continue as temporary appointees to perform their usual duties upon the same terms and conditions as heretofore until removed, appointed to positions under the provisions of this act or transferred to other departments, and they shall be eligible to such appointment or transfer without further examination, subject to the civil service law and rules where applicable and to the provisions of chapter two hundred twenty-eight of the General Acts of the year nineteen hundred eighteen and rules and regulations made thereunder. All such temporary employment shall become permanent one year from the date when this act takes effect unless sooner terminated.

SECTION 2. The Department of Institutions is hereby established under the control and management of a director, with an advisory board of eight members, all of whom shall be appointed and may be removed for cause by the governor with the advice and consent of the council, and any vacancy shall be filled by appointment in the same manner for the remainder of the unexpired term. The director and board members shall hold office for terms of five years, except that when first appointed two members of the board shall have terms of four years, two of three years, two of two years and two of one year. The director shall be a physician with adequate training and experience in the control and management of state institutions and in the care and treatment of mental defectives. He shall devote his whole time to the work of the department. At least four members of the advisory board shall be physicians registered to practice medicine in this commonwealth, two of whom shall have had special training in the care and treatment of mental defectives, and at least two members of said board shall be persons with special training or experience in penal and correctional problems or the management of penal or correctional institutions. The director shall receive such annual salary, not to exceed . . . dollars, and each board member shall receive such compensation, not to exceed . . . dollars for each

day of actual service certified by the director, as the governor and council shall determine. The director and board members shall, in addition to their salary or compensation, be reimbursed for their expenses necessarily incurred in the performance of their duties. Meetings of the board shall be held at least once in each month, and may be held at other times upon call by the director or by not less than three members. The department shall be provided with suitable quarters in the state house.

SECTION 3. The director shall be the administrative and executive head of the department. He shall administer the laws relating to the classes of persons in the institutions under the control of the department, and shall administer and enforce all laws, rules and regulations which it is the duty of the department to administer and enforce. He shall, with the approval of the advisory board, subject to the civil service law and rules and in accordance with the provisions of chapter two hundred twenty-eight of the General Acts of the year nineteen hundred eighteen, and rules and regulations made thereunder, appoint and fix the compensation of such officers, agents, clerks and other employees as may be required to carry on the work of the department, and shall assign to them their respective duties, but expenditures by the department for salaries and other purposes shall in no case exceed in the aggregate the sums annually appropriated therefor by the general court.

SECTION 4. The Department of Institutions shall be organized in three divisions—a division of mental disease institutions under the immediate charge of the director, a division of correctional institutions and a division of general hospitals. The divisions of correctional institutions and general hospitals shall each be under the charge of a deputy director with the title of commissioner. The director, subject to the approval of the advisory board and the governor and council, shall appoint such deputies for terms of five years and fix their salaries, and may remove them at any time for cause. The director, in charge of the division of mental disease institutions shall have control of all institutions now under the control and supervision of the commission on mental diseases; the commissioner of correctional institutions shall have control of the institutions now under control of the Bureau of Prisons, the State Farm, the Lyman School for Boys, Industrial School for Boys, Industrial School for Girls and the Norfolk State Hospital; the commissioner of general hospitals shall have control of the State Infirmary, the Massachusetts Hospital School and the Penikese Hospital, both subject to the approval of the director and advisory board.

SECTION 5. Except as hereinafter specifically provided, all the rights, powers, duties and obligations of the boards of trustees of state institutions heretofore controlled or supervised by the commission on mental diseases and the State Board of Charity are hereby transferred to and shall hereafter be exercised and performed by the Department of Institutions. Existing boards of trustees shall continue to be appointed in the same manner and to hold office for the same terms as heretofore, and

shall, where such funds exist, continue to be the custodians of trust funds created for the benefit of any of the institutions affected by the provisions of this act; *provided, however*, that the trustees of the State Infirmary and State Farm shall not hereafter have any powers or duties in relation to the State Farm at Bridgewater, but shall be trustees of the State Infirmary only. At least two of the trustees of each institution shall visit and inspect such institution once in each month, and the duties of visitation shall be so assigned that visits shall be made by a majority of the trustees quarterly and by the whole board semiannually, and reports of the visits shall be transmitted to the director of institutions whenever the trustees observe conditions requiring his attention. They shall give particular attention to the cleanliness and sanitary condition of the institution they are charged to visit, the number of persons in seclusion or restraint, the care and feeding of patients, and other matters that seem to require observation. Upon request of the director they shall investigate any sudden death, accident or injury, whether self-inflicted or otherwise, and report to the director thereon. All trustees shall have free access to the books, records and accounts pertaining to their respective institutions and shall be admitted at all times to the premises and buildings thereof. They shall record their visits to the institution in a book kept at the institution for that purpose. They shall personally hear and investigate complaints and requests of any inmates, officers or employees of the institution, and shall make such reports to the director thereon as conditions seem to require. They shall have power to require the attendance of the superintendent or any other officer or employee of the institution at any time, and their testimony in answer to questions and the production of any books or documents relative to the institution.

SECTION 6. The director, subject to the approval of the advisory board and the governor and council, and in conformity with all applicable laws, rules and regulations, shall appoint and fix the salaries of the superintendents, wardens and other officers in charge of the institutions affected by this act, and may in the same manner remove any such officer at any time for cause. The present superintendents, wardens and other officers and employees of institutions affected by this act shall continue to hold office under the same terms and conditions as heretofore, subject to the authority of the director and board to remove the superintendents, wardens or officers in charge and of the said officers to remove their subordinates in accordance with law. Persons who at the date when this act takes effect are employed by any department, board, commission or bureau superseded hereby, and are appointed to positions under the Department of Institutions in accordance with the provisions of this act, shall retain all rights to retirement with pension that shall have accrued or would thereafter accrue to such persons, and their service shall be deemed to have been continuous as if this act had not been passed.

SECTION 7. The powers and duties heretofore exercised and per-

formed by the Board of Parole of the Bureau of Prisons shall hereafter be exercised and performed in the Division of Correctional Institutions by a deputy commissioner of correctional institutions who shall be appointed for a term of five years and may be removed by the director of institutions, with the approval of the advisory board and who shall receive an annual salary fixed in accordance with the provisions of chapter two hundred twenty-eight of the General Acts of the year nineteen hundred eighteen and rules and regulations made thereunder.

SECTION 8. The director, with the approval of the advisory board may establish in the department a financial bureau, may assign officers and employees of the department thereto and determine their powers and duties, and may delegate to said bureau authority to control the purchasing and distribution of all stores, supplies, materials and equipment required for the use of any institution of which the department has charge, notwithstanding the provisions of existing laws conferring upon any officer of any such institution the authority to purchase or distribute stores, supplies, materials and equipment — *excepting, however,* such stores, supplies, materials and equipment as are required by existing laws to be purchased or distributed by other state officers or departments. Action by the director, the advisory board or the financial bureau under the provisions of this section shall conform to any rules and regulations made under the provisions of sections three and four of chapter two hundred ninety-six of the General Acts of the year nineteen hundred sixteen.

SECTION 9. The director shall prepare and present for the approval of the advisory board rules and regulations governing the conduct of the department and the making of contracts under its authority, general rules and regulations applying to all institutions controlled by the department, and general rules and regulations for groups of similar institutions, and such rules and regulations shall take effect upon approval by a majority of the board members and at such time as they by vote shall fix. The director shall, in consultation with the superintendent or warden of each institution, prepare special rules and regulations to govern the conduct of such institution, of officers and employees thereof or the patients or inmates therein. Such rules and regulations shall be reviewed by the board of trustees, if any, of the institution to which they apply at a meeting to be held within fifteen days after notice to such trustees, and said trustees shall report their criticisms and recommendations to the director within ten days after such meeting. The director shall then make such revision of the proposed rules and regulations as he may deem proper, and shall present them to the advisory board for action, and such rules and regulations shall take effect upon approval by a majority of the members of said board and at such date as the board by a vote shall fix. Rules and regulations effective under the provisions of this section may be altered, revised or amended in the same manner in which they were originally adopted.

SECTION 10. So much of this act as relates to the appointment of the director of institutions and the members of the advisory board shall take effect on the first day of . . . in the year nineteen hundred . . . The other provisions hereof shall take effect upon the appointment and qualification of said director and board members, but not before the first day of . . . in the year nineteen hundred . . .

SECTION 11. All acts and parts of acts inconsistent herewith are hereby repealed.

The bills introduced to meet the demand of the new constitutional amendment, requiring the consolidation of multitudinous boards and commissions into single-headed departments numbering not more than twenty, plan to co-ordinate State activities having somewhat similar functions. They also give the Governor definite authority to fix the responsibility for the proper administration of the affairs of the departments, and, so far as relates to institutions, no doubt aim at improvement, unification and a certain standardization in institutional management.

The first bill contemplated the establishment of a department of institutions which would include the present Prison Bureau with four institutions, the Commission on Mental Diseases with thirteen institutions, the institutions under the State Board of Charity numbering twelve, and the Commission on Probation; a total of four distinct departments and twenty-nine institutions. In addition these departments have supervisory and inspectional jurisdiction over a large number of county, correctional and private institutions.

The second bill differs from the first, so far as the institutions included in the consolidation are concerned, in not including the tubercular sanatoria — which are placed under the control of the Department of Public Health.

At the close of the last fiscal year these twenty-nine institutions cared for 24,194 individuals. For the maintenance of these institutions and for special appropriations for new buildings, there was appropriated last year \$10,991,223, or nearly one-third of the total amount appropriated for the entire State government. For the thirteen institutions under the Commission on Mental Diseases, which cared for 16,607 patients, there was appropriated \$6,983,853, or 19 per cent of the total moneys appropriated by the State for the year.

Attention is called to the fact that 63.54 per cent of the money appropriated for all the State institutions is for the group caring for the mentally sick, feeble-minded and epileptic patients, which

group numbers 68.64 per cent of the total cared for in State institutions. The number of institutions, the number of patients cared for, and the expenditure of approximately \$7,000,000, would warrant, it is maintained, a separate department for the purpose.

The history of the care of the mentally sick and defective has a very definite bearing on the subject. All dependent insane were first classed as paupers. The earliest legislation in Massachusetts was in 1676, which delegated the care of the insane to the selectmen and overseers of poor. In 1736 this power was transferred to the judges, whose actions were largely based on the opinions of the overseers of poor and selectmen. In 1727 the disorderly persons had become so numerous that a colony workhouse was built to which all disturbers of the public peace were committed, regardless of their mental condition. A little later another law was passed to confine such disorderly persons in county jails, but this was repealed in 1797.

According to Mosher, the first statute in existence regarding the insane is a law passed in 1788. This act provided: —

Whereas there are persons who by lunacy or otherwise are furiously mad and so disordered as to be dangerous to go abroad, it shall be lawful for two or more justices of the peace to cause to be apprehended and kept safely locked up such persons in some secure place and, if necessary, to be chained there.

It was not until 1827 that an act was passed providing that lunatics shall not be confined in any prison, jail or house of correction in the same room with a person charged with a criminal offence.

The early care of the insane was purely custodial in character. Being classed as paupers the contract for their care was awarded to the lowest bidder. The early care of this class was an emergency proposition and nearly every State has a history of county care.

The first pauper insane State hospital was opened in Worcester in 1833. It will be seen that the development of the State hospital was slow and accomplished only after a long struggle. The care of the mentally sick group has not been recognized as a strictly medical problem for any great number of years.

In Massachusetts, the Board of State Charities was organized in 1863, and for the first time the insane came under some supervision. Section 4 of said act provides that —

They shall investigate and supervise the whole system of public charitable and correctional institutions of the commonwealth and shall recommend such changes and additional provisions as they may deem necessary for their economical and efficient administration. They shall have full power to transfer pauper inmates from one charitable or lunatic hospital to another and for this purpose to grant admittance and discharges to such pauper inmates, but shall have no power to make purchases for the various institutions. They shall have no compensation for their services except their actual traveling expenses which shall be allowed and paid.

Early in 1876, in consequence of facts and considerations which the Board of State Charities submitted to the Legislature, the Governor recommended the appointment of a commission to inquire into the expediency of revising the administration of the public charities of the Commonwealth, and a commission was so appointed. Hearings were held and the commission recommended that one member of each of the institution boards of trustees be made a member of the supervisory Board of Charities. (The commission consisted of three persons sitting as a recess committee of the Legislature.) Their recommendations were not accepted, and Governor Talbot introduced a bill which resulted, in 1879, in the creation of the State Board of Health, Lunacy and Charity.

In a short time this organization began to be criticized, and the claim was made that the board as constituted was not in the best form to do efficient work. It is interesting to note that in defence of the Board of Health, Lunacy and Charity, Governor Talbot stated that his experience and observation convinced him that if these departments could be consolidated, they could be made to co-operate more readily in the general service of the public, that duplications of figures, statements and reports could be brought together in more concise form, and be therefore in more useful shape.

In referring to reports of that period, an editorial appeared in 1881 in the Boston "Herald," — "an unanswerable argument against the present Board of Health, Lunacy and Charity." Four members of the board resigned. Dr. H. I. Bowditch, who had seen long service on the Board of Health and who was also a member of the Board of Health, Lunacy and Charity for several months, was asked if the board in his opinion was a properly constituted and efficient body. He stated: —

On the contrary, I think the effect of the present combination of three things, each requiring a widely different treatment, is a great injury to all of them. All of the board, with the exception of the secretary, are unpaid and while under the old condition of things might spare the time to attend to the business of separate boards, as the board is now combined are called upon to do three times as much work as formerly, much of which they are practically unfitted for or have no taste for. Men who should have only matters pertaining to the public health to consider are called upon to hear and investigate matters connected with the public charities, or with lunacy, which they know nothing about.

He gave as the reason for his resignation that he found he was called upon to do work which he felt he was not competent to do. Dr. Bowditch stated that he had served on the old Board of Health with great delight, that he took a deep interest in the work and would be there then if it had not been consolidated with other departments of the public service.

In 1886 an act was passed establishing a State department of health, the Board of Lunacy and Charities retaining their former functions.

The report of the Board of Lunacy and Charity for 1894 referred to the shortcomings of the superintendents, etc. These and other matters resulted in petitions being presented to the Legislature for a separate Board of Lunacy. In 1896 a resolve was passed authorizing the Governor to appoint a commission of three persons to investigate the public charitable and reformatory interests and institutions of the Commonwealth, to inquire into the expediency of revising the system of administering the same, and of revising the existing laws in regard to pauperism and insanity, etc., as follows: —

Resolved, The governor by and with the advice of the council be and hereby is authorized to appoint a commission consisting of three persons to investigate the public and charitable and reformatory interests and institutions of the commonwealth, to inquire into the expediency of revising the system of administering the same and of revising the existing laws in regard to pauperism, insanity, etc., including all laws relating to pauper settlements, and furthermore to inquire into the relation of pauperism and insanity to crime with a view to securing economy and efficiency in the care of the poor and insane of the commonwealth.

This commission recommended the creation of a State Board of Insanity consisting of five members. The State Board of

Insanity accordingly was established in 1898, and the former Board of Lunacy and Charity became the Board of Charity.

In 1914 the Board of Insanity was reorganized, having three paid members in place of the unpaid board of five members, with increased powers and duties. In 1916 chapter 285 of the General Acts abolished the State Board of Insanity and established the Commission on Mental Diseases.

Thus it will be seen that the establishment of a department of institutions which would include penal, charitable and institutions for the care of mentally sick is a return in a general way to a former method of supervision and control, except that instead of a single head to the department there was a board consisting of several members. This form of supervision and control was found impractical between the years 1879 and 1886.

The outstanding reasons for the consolidation of various groups of institutions into one department of institutions — based upon an experience with legislative committees and State departments having a great deal to do with institutional affairs — is largely for business considerations, the possibility of business standards found to be successful in one group of institutions being made use of by other groups.

A former State Board of Insanity very wisely created a financial bureau which has served a very useful purpose in Massachusetts in checking up the work of the various institutions and making known the results to all. Each institution is now required to make an annual estimate for maintenance, which is carefully analyzed by the Commission on Mental Diseases, and the results submitted in such form to the Supervisor of Administration for incorporation in the Governor's budget that the finance committees of the Legislature and the Legislature itself have made the appropriations as approved by this commission with practically no changes.

The function of this financial bureau working in connection with the individual institutions under the Commission on Mental Diseases has served to meet all criticism from a business point of view, and yet leave the initiative in administrative matters very largely to the institutions. It is believed that the success of institutions in Massachusetts — from the standpoint of administration — is very largely dependent upon the recognition of this relationship between the financial bureau, a department of the commission, and the institutions. Mention is made of the work of the financial bureau inasmuch as it serves in every way

to meet the criticism that better business methods prevail under a different form of supervision and control.

It has been the aim of the commission to be constructively helpful to the institutions, bringing to the managements information and advice through experts, in problems affecting the institutions, and, in so far as possible, leaving to the institutions the actual administration.

A brief analysis of the first bill discloses the fact that the director of this large department is appointed for a term of only three years, — too short a period to formulate and execute a definite State policy. While possibly the man best qualified would be named to this position, no requirements are given, and one not having actual experience in the management of the institutions might be selected. The bill would abolish boards of trustees which in Massachusetts have served a useful purpose in the supervision and management of institutions.

The practical difficulty would be the grouping together of institutions caring for correctional cases on one hand and the mentally sick and defective on the other, the character of the care having nothing in common other than certain phases of business administration.

It is maintained that it would be difficult to find any person who would possess all the qualifications that the director of so large a group of institutions should have, — who would not only be an expert in mental diseases but likewise a penologist as well, — and at the same time be familiar with the needs of the training schools, management of institutions caring for the tubercular and other types of patients, etc.

The bill submitted by the Supervisor of Administration would result in very little change over existing conditions, so far as the Commission on Mental Diseases is concerned, inasmuch as the work carried on by this commission would be maintained as a distinct division of the new department of institutions.

Additional duties are placed upon the director in his relation to the other divisions, but no provision is made for his relief from those duties dealing with the present work of the commission. In effect, it would appear that the director would be more or less of a figurehead and that the various divisions would be quite independent. This would seem inevitable for reasons already given, namely, that no one man would have become an expert in the three great divisions contemplated in the bill.

The subject is one that has been worn threadbare with discus-

sion. Radical changes in supervision and control of State institutions are frequently proposed by legislators, largely, it is believed, on the theory that financial saving would result. It was brought out at the hearings in connection with the proposed changes in supervision that the consolidation of departments would probably not result in any economy.

Two States, with a form of supervision and control quite similar, care for the largest numbers in their institutions and have the largest admission rates. It is maintained by those actively interested in the problem that legislative bodies should move slowly in enacting changes that would result on the part of the people served in less confidence in the institutions caring for mental cases. If it be conceded that the care and treatment of the mentally sick is a highly specialized medical problem, requiring the services of medical experts, and that the institutions function primarily for the welfare of the patient, then the supervision and control of institutions should be in the hands of medical men especially trained for the purpose. It is absurd to advance the argument that a medical superintendent cannot be a good administrator.

However, it should be borne in mind that questions dealing with mental disease, mental defect and mental hygiene do have a very definite bearing on the work of the other divisions. Surveys show that 20 to 25 per cent of the prison population are feeble-minded, and probably up to 50 or 60 per cent abnormal mentally. There are many points of contact also with the departments of health, education and public welfare.

No great difficulty should be experienced in co-ordinating the methods of business administration of State institutions and yet give to the large departments separate organizations to carry on activities in their special fields.

The heads of these departments — mental diseases, health, education, public welfare and corrections — could constitute a small organization for the purpose of co-ordinating institutional work, especially that relating to administration, and also deal with problems having to do with one or more groups.

The bill as finally reported to the Legislature by the committee does not change the status of the Commission on Mental Diseases.

41B
87

